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POULTRY HOUSES and EQUIPMENT

J. E. DOUGHERTY
and H. L. BELTON

Revised by

H. L. BELTON and
V. S. ASMUNDSON

THE COLLEGE OF AGRICULTURE
UNIVERSITY OF CALIFORNIA · BERKELEY

Many Kinds of Poultry Houses

are used in California. The styles range from the concrete-floored tightly weatherproof structure to the wire-bottomed open cage house, with many variations in between. The great range of climates in California has accounted for the variety of poultry houses which have been developed and which are used with success.

THIS BULLETIN does not attempt to show all the possible combinations of concrete, wood, and wire which make good poultry buildings. Basic designs are shown, and a number of variations are suggested. The poultryman can adapt these to the climate of his particular locality, the slope of his land, and the size of his flock.

Any poultry house should provide the comfort and space needed by the birds for proper health and production. And its arrangement should allow necessary work to be done with minimum time and energy. The layouts and construction details in this bulletin are especially designed to those ends.

(Please turn to page 75 for Table of Contents)

THIS BULLETIN was issued first in 1929 and has been reissued several times since. Last previous revision was made in 1940, and it is again revised in the present edition.

THE AUTHORS: J. E. Dougherty was until 1932 Associate Professor of Poultry Husbandry and Associate Poultry Husbandman in the Experiment Station. Since retirement he has been engaged in poultry raising at Davis, California.

H. L. Belton is Associate in Agricultural Engineering.

V. S. Asmundson is Professor of Poultry Husbandry and Poultry Husbandman in the Experiment Station.

POULTRY HOUSES and EQUIPMENT

J. E. DOUGHERTY and H. L. BELTON

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The fundamental purpose of a poultry house is to promote the comfort of the stock it houses. The success with which the house meets the needs of the birds is measured by low mortality, by the egg production of laying hens, and by the growth of young birds which, of course, are also influenced by many other environmental factors, as well as by heredity. In California, shelter from rain, wind, and heat is important, while protection from intense cold is usually unimportant.

Poultry houses in general use show a wide range in the protection they afford the birds. At one extreme is the stormproof, wood-walled house with concrete or wood floor. At the other extreme is the wire-walled house with wire or part-wire floor which provides a minimum of protection from rain and wind. The wood-walled type of house has been used successfully in all parts of the state. The wire-walled types have been used mostly in the southern and south central parts of California; they are best adapted for use in sheltered locations, or under mild climatic conditions.

The following discussion of poultry house requirements applies specifically to the wood-walled type of house, although much of it is applicable to all houses. Poultry house construction should provide:

- Comfort for the birds,
- Requisite space for the birds,
- Type of construction and facilities for easy cleaning,
- A layout that saves time and labor.

Comfort for the Birds

Dryness. Dryness checks the development of most disease organisms and increases the comfort of the birds, and is therefore an important essential of a well-designed poultry house. It has not been shown, however, that the amount of moisture in the litter is related to the egg production of the birds, nor that the humidity in a brooder house is related to the growth of the chicks.

Ventilation without Drafts. Ventilation is essential in a poultry house to supply the birds with enough fresh air to meet their body needs and to carry away the exhaled air and the fumes arising from the droppings. In stormproof poultry houses ventilation should be provided without injurious drafts from cracks and knotholes. Obviously, ventilation is not a problem in wire-walled poultry houses.

Direct Sunlight in Winter. Sunlight increases the comfort of the birds in winter by bringing warmth and cheer into the poultry house. It is a powerful drying, disinfecting, and purifying agent, and a natural source of ultraviolet light.

In order to admit a maximum amount of direct sunlight in winter, a poultry house should face south. Where this is not feasible, a southeast facing is second in order of desirability; and an east facing, third, although in some districts east is the preferred direction to face the house. North is an undesirable direction in which to face a poultry house.

Merely facing a poultry house south will not insure that a maximum amount of direct sunlight enters the house unless it is properly designed. The shed roof house economically provides the size and shape of openings most effective in admitting winter sunlight.

Coolness in Summer. A poultry house should be cool in summer. Fowls suffer extremely from high temperatures, particularly in late spring, before they have become adjusted to hot weather. The mortality from this cause, especially in adult stock, may result in greater annual losses than from disease. Shade and a free circulation of air are the most practical means of keeping a poultry house cool and preventing losses from heat prostration.

Sprinkling the floor sufficiently to dampen the litter on abnormally hot days aids in reducing the temperature of the interior of the house and makes the birds more comfortable. Wetting the birds when sprinkling the floor does them no serious harm. The installation and operation of overhead sprinklers, which wet the roof and immediate surroundings, is cheaper than using evaporative coolers, and is effective enough for practical purposes. (Overhead sprinklers are shown on page 32; evaporative cooler on page 73.)

Large deciduous trees that shade the front and roof and are not too close represent one of the best ways of protecting a poultry house from the hot summer sun, provided the birds are not given access to the wet or damp areas during or after the irrigation of the trees.

Space for the Birds

Floor Space. Crowding is detrimental, whereas giving birds more house room than they can effectively use increases investment and operating costs.

The recommended minimum floor space per bird when housed in lots of more than 125 per pen is 2½ square feet per bird (table 1). If yards are not provided, the minimum space should be increased to three square feet of floor space per bird. When housed in larger groups, there may be a loss due to the increased hazards from disease that will result in decreased production. There are also considerable data to show that large flocks do not lay so well as smaller flocks because of the increased competition among the birds for feed and water, and the greater opportunity for cumulative action of the stronger against the weaker birds. On wire floors where the capacity of the pen is determined mostly by feeding space, requirements are about one hen per square foot of floor space.

Table 1. RECOMMENDED FLOOR SPACE PER BIRD

Number of birds in a pen	Floor space per bird	
	For light breeds, such as Leghorns	For heavy breeds, such as Rhode Island Reds and Plymouth Rocks
1–75	3½ sq. ft.	4½ sq. ft.
76–125	3 sq. ft.	4 sq. ft.
Over 125	2½ sq. ft.	3½ sq. ft.

Roosting Space. The consideration of roosting space is also important in determining the hen capacity of a poultry house or a pen within that house. For light breeds such as Leghorns, 6 linear inches is considered the minimum, and 8 linear inches the optimum amount of roosting space needed per bird. For the larger breeds, such as New Hampshires, Rhode Island Reds and Plymouth Rocks, these measurements should be increased 2 inches. The minimum roosting space would probably be sufficient in cold weather, but in hot weather the birds would be crowded too close together.

Pen Capacity. The 18 × 20 foot unit shown in this bulletin as the basic laying house (page 23) will accommodate 150 birds of the lighter breeds, allowing approximately 2½ square feet of floor area per bird. It is equipped with a droppings board 5½ feet wide, and five roosts allowing the optimum (8 inches) of roosting space per bird. This arrangement has proved economical from the management standpoint for the flock maintained in small units, as for breeders, for trapnesting, and for commercial flocks of pullets of different ages, or when the unit is desired as a brooding pen.

For the poultry keeper who desires to maintain his flock in large units, a pen double the unit size, or 18 feet deep and 40 feet long, and with a capacity of 300 birds of the light breeds (table 1), may be constructed for layers. This size of pen is readily obtained from two 18 × 20 foot units by omitting the partition between pens, forward of the droppings board. If more than the recommended number of birds is to be kept in such a pen, it may be necessary to move the partition doors 1 foot forward, widen the droppings board to 6½ feet, and install six roosts.

Wider Houses. Another method of providing for a larger unit is to make the house deeper from front to rear. The regular shed-roof laying house can be built 2 to 4 feet wider using the same framing methods. If the width is increased more, however, it may be necessary to change the style of roof and provide heavier rafters and greater support. This may increase the cost per square foot of floor space to more than that of a narrower house.

Ease of Cleaning

Removal of Litter. One hundred Leghorn hens will void about 8 to 10 pounds of manure daily. The removal of this material, and the necessary renewal of litter in the poultry house, is a continuous job for the poultryman.

It is an unsanitary practice to permit night droppings to fall on the floor and become mixed with the litter. One preventive method is to partition off the floor under the roosts and to cover the pit so formed with wire (fig. 34). However, the use of a dropping pit within the house reduces floor space available to the birds. An alternative method is the use of droppings boards and wire under the roosts, making the entire floor space available, and at the same time keeping droppings out of reach of the birds (fig. 22).

The use of a litter carrier will facilitate the daily cleaning of the droppings board, particularly in a long house (fig. 69).

When the floor litter is cleaned out, a larger amount of material has to be removed and can be conveniently handled in a wheelbarrow or a litter carrier. To facilitate this work, provision should be made for driving a larger conveyance up to the door of each section of poultry house, so that the litter may be loaded directly into it. If removable 8-foot panels are inserted at the house end of each line fence, as described on page 51, removing them will provide an adequate driveway.

A Durable Floor. Because of its hard usage and need for frequent cleaning, the floor of the poultry house must be durable, impervious to water, and well drained. The concrete floor meets these needs most satisfactorily.

Any poultry house accumulates a great deal of dust and dirt from scratching litter, fresh droppings, and dirt tracked in from the outside. Removal of this dirt requires scraping, shoveling and sweeping, which is hard on any floor.

Disinfecting the poultry house is only effective if done when the house has been thoroughly cleaned by scrubbing. Disinfectant applied over even a thin layer of dirt loses its efficiency, since so much of it is absorbed by the dirt before it can reach and kill the germs. Scrubbing and hosing out the house requires good drainage, which is easy to obtain in a concrete floor at the time it is laid.

In time a wood floor will absorb a great deal of water, unless thoroughly impregnated with oil. Water will curl and dish the boards, resulting in a corrugated floor which is difficult to scrape. A concrete floor is as low in first cost as a good board floor, and will last indefinitely.

A Well-Planned Layout

Before starting to build on a new poultry farm, a carefully prepared plan should be drawn to ensure the orderly location of each building. Much labor in distributing feed and doing routine work can be saved by proper arrangement of buildings. This is especially important where many small units such as outdoor brooders and batteries are used. Many an old poultry farm also can be improved by some changes after a thorough job analysis.

Construction Details FOR ANY POULTRY HOUSE

FOUNDATION AND FLOOR

Concrete Foundation. A poultry house with either a concrete or a wood floor should have a concrete foundation.

A reasonably level, well-drained site lends itself to a concrete slab floor poured directly on the dirt, within the confines of concrete foundation walls. This pouring may be done at the same time the foundation is poured, or it may be done in a separate operation. Such a floor puts the poultry house on the ground level and eliminates steps.

Where the terrain, or the house construction, does not lend itself to a solid cement slab floor, then a wood floor can be built on concrete foundation walls. The space under the house must be well ventilated to prevent decay of sills and floor. The foundation walls should be constructed high enough for a small dog to run under the house, else this area may soon become infested with rats.

There are conditions, for example when building on a steep slope or when all- or part-wire floors are desired, when the use of wooden blocks or posts for the foundation is required.

Materials for Concrete. The proper mixing of the concrete as well as the method of construction must receive consideration if durable, well-finished concrete floors are to be obtained.[1]

Sand and pebbles, known as aggregates, should be clean, free from fine dirt, loam, clay, or vegetable matter. These materials are objectionable because they prevent adhesion between cement and particles of sand. The coarse aggregates, crushed stone or pebbles, should be fairly hard and range in size from ¼ inch up to 1 inch. The sand or fine aggregate should be well-graded and vary in size from fine up to ¼ inch.

If creek gravel is used, samples should be screened to make certain that it contains approximately the correct proportions of fine and coarse aggregate recommended for the mix. Otherwise, sufficient of the excess size should be screened out and the pile remixed to bring the aggregates to the desired proportion. A concrete mix with poorly proportioned aggregates or one that does not contain the proper amount of cement may, under certain conditions, provide a fairly satisfactory floor for a poultry house. But damp floors and moist litter in brooder and laying houses are usually caused by moisture absorbed from below through concrete that has been poorly constructed. To correct such a fault is usually more expensive than the first cost of a good floor.

Methods of Pouring. A concrete floor and foundation for a poultry house may be constructed by two different methods. The usual method is to pour the walls of the foundation first and later put in the floor. The floor may pull away from the foundation wall unless tied to it with steel reinforcing. The second method is to pour both floor and foundation together, as shown in figures 1 and 2.

With either type of construction, the proper height of the foundation wall is first determined and the corner stakes of the building driven. On level, well-drained land, the floor can be as low as 5 inches above the ground at the front of the house; at the rear it should be 3 inches higher. Then the estimated amount of material needed for the fill should be hauled in or scraped in with a Fresno scraper before work is begun on the forms. This eliminates the extra shoveling that would be required if the fill were

[1] Valuable literature on the mixing and use of concrete can be obtained on application to the Portland Cement Information Bureau, 564 Market St., San Francisco.

not put in until after the foundation wall forms were in place. The fill should be made with damp earth, not more than 3 inches in depth at any one time, and firmly tamped into place to prevent settling that would damage the floor. On adobe or heavy soil, the earth fill should receive an additional treatment of 1½ to 2 inches of sand or fine gravel fill to insure a good floor.

In using the second method, only the outside forms for the foundation wall are used, and the end-wall forms are given a slope of 3 inches from rear to front. The front-wall forms are therefore 3 inches lower than the rear-wall forms, and the finished concrete floor has that amount of fall from rear to front.

After installing the outside-wall forms, the fill should be carefully graded so that the top of the fill will be 3 inches below the tops of the forms. With a well-firmed fill, a floor 3 inches thick will be found heavy enough for a hen house.

To provide a foundation wall, a narrow trench should be dug all around the house just inside the forms (figs. 1 and 2). This trench need not be over 6 inches wide but should be deep enough to keep rats from burrowing under the foundation wall—about 12 inches. If the inside wall of the trench tends to cave in, it can be sloped inward toward the center of the house or a 1 × 12 inch board can be used as a retaining board. This board need not extend above the top of the earth fill and can be slipped out just before the concrete for any section of the floor is poured.

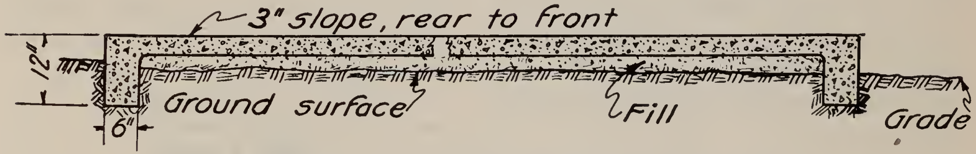


Fig. 1. Cross section of floor and foundation. Note slope of floor and thickness of foundation wall and fill.

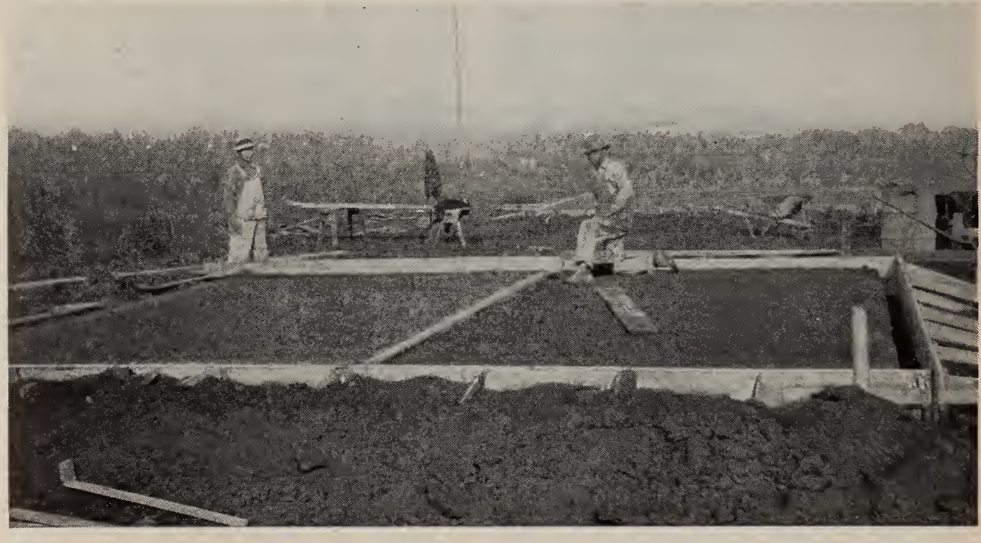


Fig. 2. Concrete foundation and floor of this poultry house are being poured together. Outside forms for the foundation have been built, and a dirt fill laid, to give the floor a slope of three inches for good drainage.

Mixing, Finishing, and Curing. A 1:2¼:3 concrete mix using 5 gallons of water to each sack of cement is recommended for the poultry-house floor and foundation since a 3-inch floor requires a rich mix. This means 1 sack or 1 cubic foot of cement, 2¼ cubic feet of fine aggregate, and 3 cubic feet of coarse aggregate. When damp aggregates are used, 4½ gallons of water will generally make a workable concrete. Some tamping will be required. After this the surface should be gone over with a wooden float to produce an even surface free from humps and hollows, and then finally finished with a steel trowel, to produce a smooth dense finish.

Moisture is essential for the proper hardening of concrete. A covering of 2 or 3 inches of sand or straw which is kept moist for 6 or 8 days by sprinkling is recommended when the concrete is exposed to wind or sun. This covering should be put on just as soon as the concrete is hard enough to prevent marring of the surface.

THE WALLS

Selection of Lumber. The normal stock lengths of lumber, usually 8- to 20-feet, cut economically into the fixed dimensions of the poultry houses described in these pages. The low walls of a poultry house readily lend themselves to placing siding lumber vertically and to the use of short lengths. Surface tongue-and-groove lumber laid vertically makes a satisfactory exterior wall for a poultry house. Defects such as pitch pockets and small tight knots, usually found in the cheaper grades, do not detract from the value for wall siding. It is superior to 1 × 12 inch boards and battens. It lays up well and makes a tight wall. It is surfaced so that it takes less material and labor to paint than do rough boards, and offers less favorable environment for parasites.

Wall Framing and Siding. Bolts spaced approximately 5 feet apart should be embedded in the concrete to hold the sills rigidly to the concrete floor. The house frame (fig. 29) contains the minimum amount of material consistent with good practice. It should therefore be properly fitted and nailed together. The tongue-and-groove lumber recommended for wall siding should be laid vertically, top-nailed and blind-nailed to the sill and plates, and blind-nailed to all intermediate rails or braces. A careful selection of material to secure a tight, draftproof rear wall around the roosting area is particularly important.

Use properly seasoned lumber for siding. If not well seasoned, drying will open wide cracks between the boards and may cause splitting of the boards where they are nailed. Plyboard panels of waterproof quality or other types of hard surface composition panels may be used when the stock sizes fit into the wall construction economically.

THE ROOF

Roof Framing and Sheathing. Rafters 2 × 4 inches in size, spaced 2 feet on centers, and supported by a girder to shorten the span between front and rear wall are recommended. (Note point E, figs. 26, 29.)

Matched roof sheathing, preferably with a lap joint, is desirable, although surfaced and sized 1 × 6 inch boards may be used. When roofing paper is used the sheathing must be dry, since cracks resulting from shrinkage permit the movement of air under the roofing paper and the damage resulting shortens the life of the roofing paper.

Use of Roofing Paper. Roofing paper is one of the most economical materials that can be used for a poultry-house roof. If a good grade of 3-ply paper is used and is coated every two or three years with a good quality of asphalt roofing paint containing asbestos, it should last indefinitely

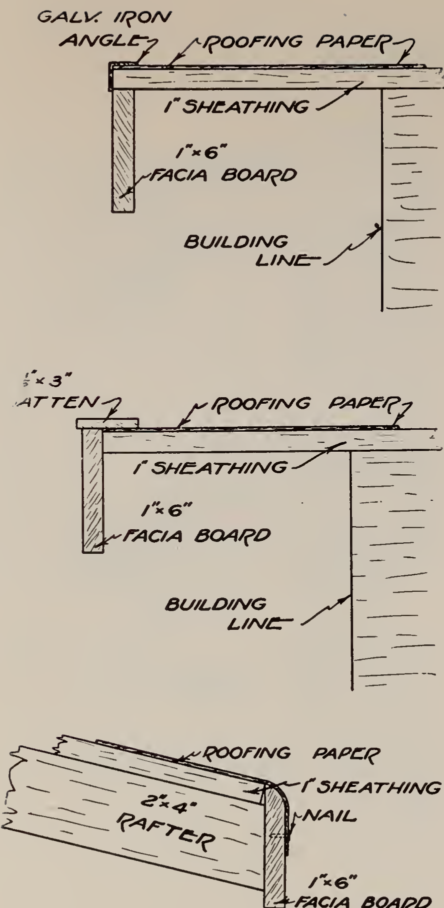


Fig. 3. Methods of fastening roofing paper at the edges of the roof.

as far as deterioration of the paper itself is concerned.

Lay roofing paper up and down the roof, so that the strips of paper extend across the sheathing boards rather than parallel to them. This insures a more solid nailing of the paper. When the roofing is laid parallel to the sheathing boards, so many roofing nails are driven close together into one board that it is very apt to split and the nails become loosened. The lap should be laid in the direction of the heaviest winds to keep the wind from blowing against the lap and tearing the paper loose. Methods of fastening the roofing paper at the edges of the roof and of installing gutters are shown in figures 3 and 5.

Use of Corrugated Metal Roofing. Corrugated sheets of 26-gauge material carrying not less than 2 ounces of zinc galvanizing per square foot, or aluminum sheets of the same gauge, may be used for a poultry house roof. Metal sheets should be laid on tight sheathing, as noted above for roofing paper, in order to prevent "sweating" which causes moisture to drip from the roof and dampen the litter. When laid on scantlings without sheathing, sweating may occur in the winter season during periods of low temperature and high humidity. If to reduce the cost of the poultry house the roof is left unsheathed, a drip catcher may be used. This may be made by nailing a board to the underside of the purlin so that it will catch moisture dripping from the underside of the metal sheets. This is not practical in very long houses. (Fig. 4.)

The kind of roofing material used has very little if any effect on the interior temperature of the open-front shed-roof poultry house described in this bulletin.

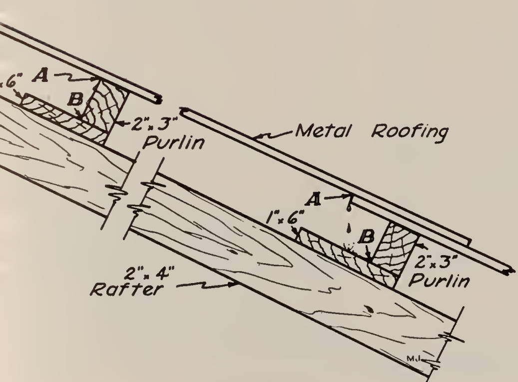


Fig. 4. Drip catcher for unsheathed metal roofing. The 1 × 6 inch board should be nailed securely to the 2 × 3 inch purlin. An asphalt paint sealer is advisable at B. The moisture will drip from the points A.

4 Ways to Install Gutters

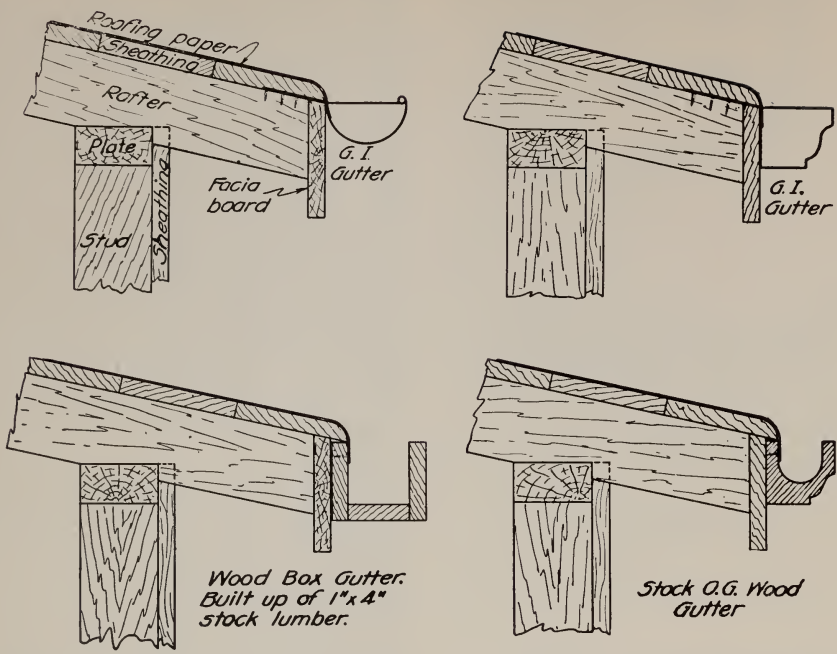


Fig. 5. Four styles of gutters, showing how to install them on a shed-roof poultry house.

Details for Outside Doors

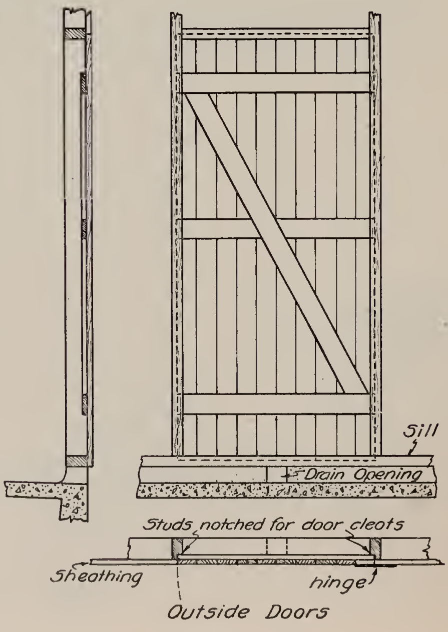


Fig. 6. Plan for construction of outside doors. Note that door laps the door frame on four sides, and fits flush with wall siding at either side.

Outside Doors. All outside doors are made of the same material as the walls, tongue-and-groove lumber laid vertically. In placing the siding lumber around the door opening, it should stop an inch from the inside edges of the 2 × 4 inch frame (fig. 6). This will allow the door to fit flush with the wall siding and lap the door frame 1 inch at top and sides. The bottom of the door may extend down as far as desired. The door cleats should extend the full width of the door in order to get a firm nailing for the outside boards, and the frame should be mortised to receive the ends of these cleats.

Rear Windows. To increase air circulation in hot weather, windows in the rear wall (fig. 7) near the floor have been found helpful. They light the floor under the droppings board. When they are opened on hot summer days, the circulation of air over the floor and through the house is materially increased, adding to the comfort of the birds.

The trim for the window sash in the rear wall should be nailed in place after the wall has been completely sided and before the window openings are cut. Top and bottom trim should be firmly nailed to each siding board to be cut. Cutting these openings after the wall is finished is usually a better method than fitting around the openings as the siding is put on. Each opening should be cut 1 inch smaller all around than the sash so that it will lap the opening 1 inch on all sides and thus fit more tightly when closed (cut opening 16 × 28 inches for an 18 × 30 sash). The top of the opening should be 2 inches below the 2 × 4 inch rail supporting the rear edge of the droppings board (see fig. 27). This provides a nailing for the wire netting which can be most easily attached to the inside of these openings before the droppings board is constructed.

Curtains. Curtains on the front of a poultry house are used primarily as a protection against winter storms and cold winds. In some sections of the state it may be desirable that they serve as a sun shade. In the summer months, however, the sun's rays reach the earth from a high angle by midmorning; therefore the interior of a poultry house facing south would receive very little direct sunlight after 10:00 A.M. and practically none at noon.

Different climates require different types of curtains or glass sash and the poultryman should select the type of front best suited to his needs.

Rear Windows

Fig. 7. Rear view of laying house shows windows in the rear wall near the floor. These light the floor and increase air circulation.

The so-called *"San Gabriel" curtain*, believed to have originated in San Gabriel Valley, is illustrated in figures 8 and 9. It is intended for use in those localities which are subject to more or less mild storms. With the top tipped back against the house, it serves as a sunshade in hot weather and to keep out rain in winter. In cool, dry weather the top is tipped out on sunny days so that direct sunlight can enter. A curtain of this kind would be useless in preventing rain from being blown under it into the house and wetting the interior during a driving rainstorm.

San Gabriel Curtain

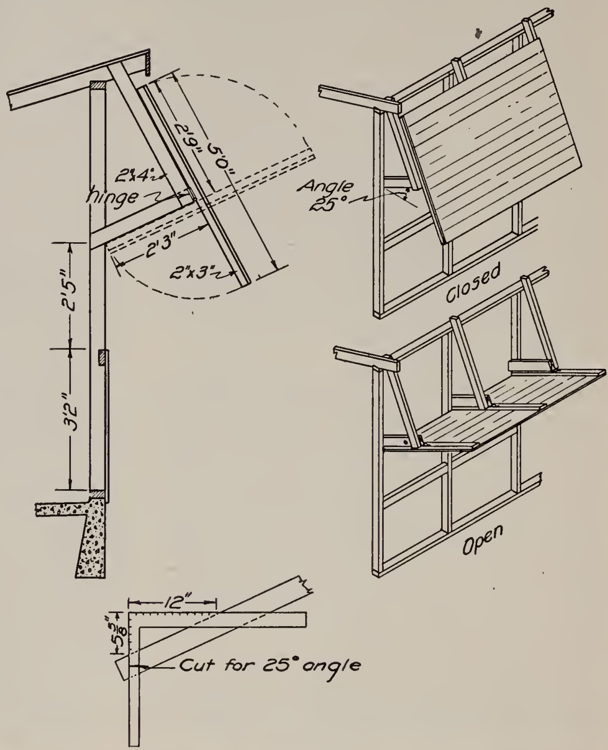


Fig. 8. Construction detail for San Gabriel curtain.

Fig. 9. San Gabriel curtain with top tipped out to admit sunlight.

The *sliding curtain* shown in figures 10 and 11 offers protection from rain and wind. It may be raised or lowered like a common window for the admission of air and direct sunlight. When lowered enough to cover all of the open front, it is storm-tight. It will not serve, however, as a shade or awning in hot weather. The advantage of curtains of this type is that they are protected, except when in use, and last longer.

Sliding Curtain

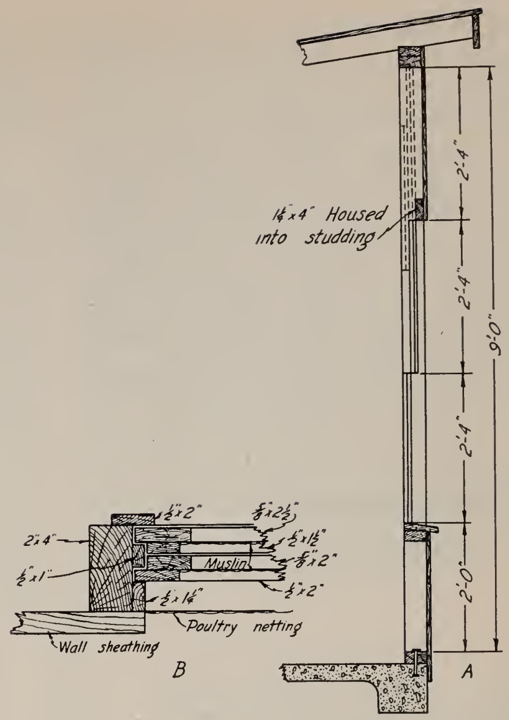
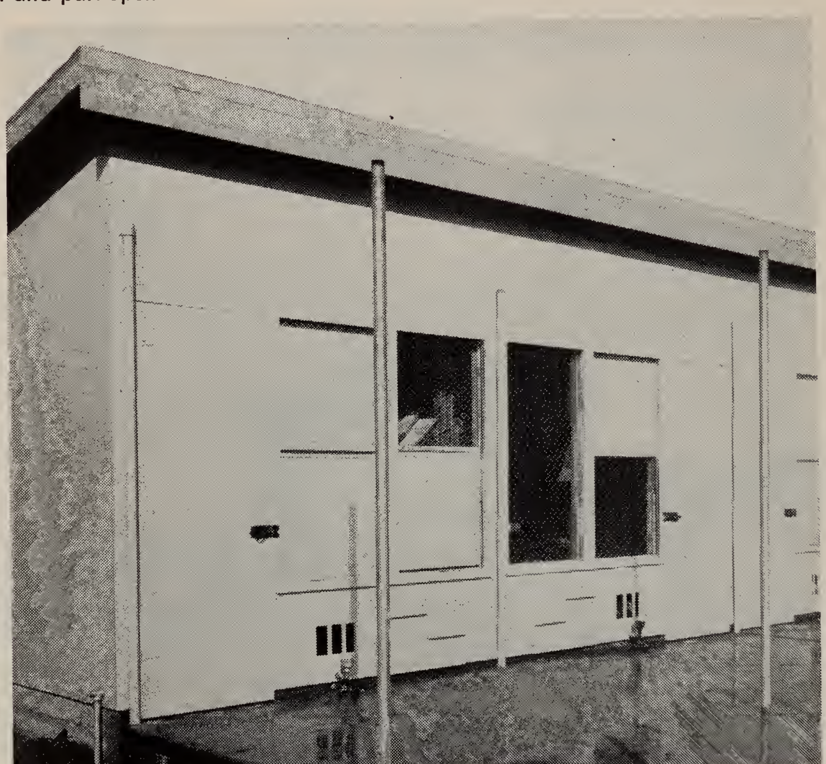


Fig. 10. Construction details for sliding curtain frames. A, section through front wall; B, section about studding.

Fig. 11. Sliding curtains are operated from inside. Note three possible positions of open and part-open front.



The *three-purpose curtain* shown in figures 12 and 13 was designed to provide a storm-tight covering for the open front in bad weather and shade the open front in hot weather without interfering with the entrance of direct sunlight when desired. With the entire curtain extended out from the bottom, it shades the interior of the house in summer; with the hinged panels swung open sunlight can enter; and when the panels are closed and fastened against the house at the bottom, the front is storm-tight and windproof.

Both the sliding and the three-purpose curtains can be closed at night in cold weather to protect the birds and increase their comfort.

The principal criticism of this curtain is that each curtain on the house must be operated individually. Poultry keepers would prefer to manipulate all of the curtains on a house from one end by means of ropes and pulleys. This can be done with the San Gabriel curtain, but no one has succeeded in operating the three-purpose curtain in groups.

Three-Purpose Curtain

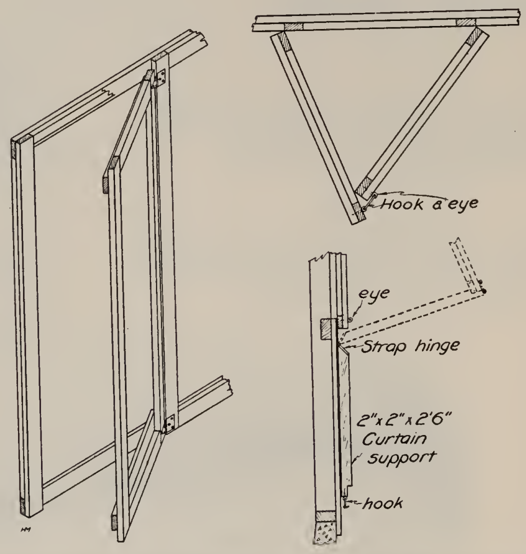


Fig. 12. Construction detail for three-purpose curtain. Additional details are shown in figure 30.

Fig. 13. Three-purpose curtain, showing some curtains closed down, and some extended at bottom for ventilation. Fig. 63 shows this same type of curtain with inner panels open to admit sunlight.

The *roller curtain* illustrated in figure 14 is easier to operate than most others. It should be permitted to dry out before being rolled up. Otherwise it will mildew and rot very quickly in wet weather.

How to Preserve Curtains

Muslin- or canvas-covered frames for storm curtains have a life of about two and one-half years; seldom does an exposed curtain serve three winters' use. To prolong the life of the muslin used on curtains, a heavy unbleached grade should be obtained and the edges of the cloth should be treated with a waterproofing compound after being tacked in place and before the molding strips are put on. The purpose of this treatment is to waterproof the cloth where it comes in contact with the wood frame.

There is an accumulation of dust in the cracks where the muslin is nailed to the frame. Because of the absorption of moisture by this dust, as well as by the wood, the cloth touching the frame dries out after a storm much more slowly than the rest of the muslin, and if not treated rots out in a short time. It usually rots first at the bottom because the water runs down the curtain and causes the bottom strip of wood as well as the cloth to become wetter than other parts. Tacking the muslin securely along its lower edge and leaving off the bottom molding strip will cause less absorption of water at this point and permit more rapid drying.

Roller Curtain

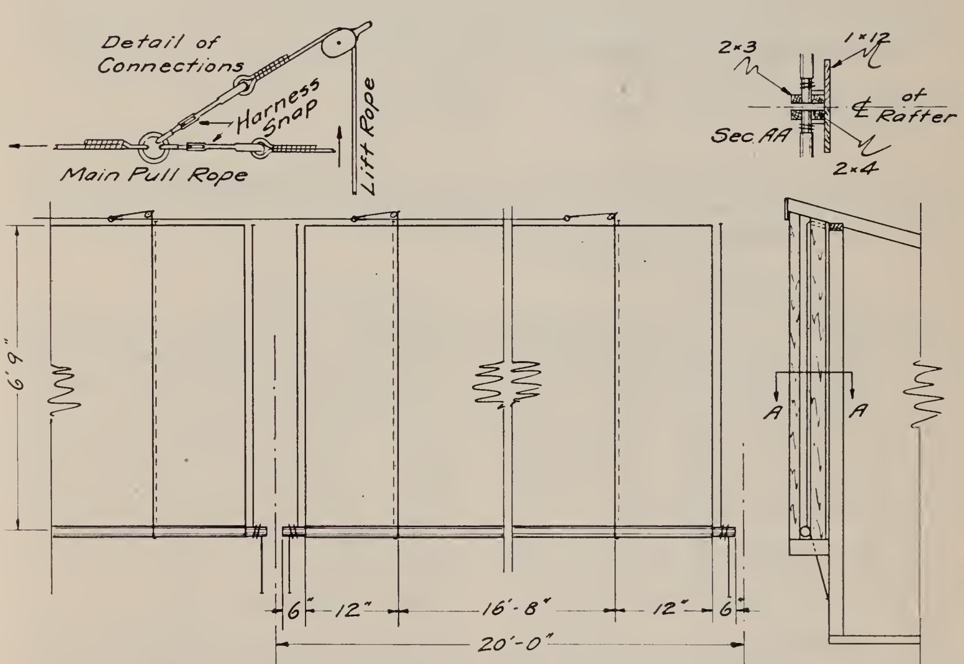


Fig. 14. Detail for construction of roller curtain. Lift cords may be cotton rope, main pull cord ¼-inch clothes line wire. Heavy unbleached drilling makes a suitable curtain.

Use of Glass Sash

Fig. 15. Glass window sash offers best protection against winter storms and winds. These lie flat against the house front when open, admitting maximum sun.

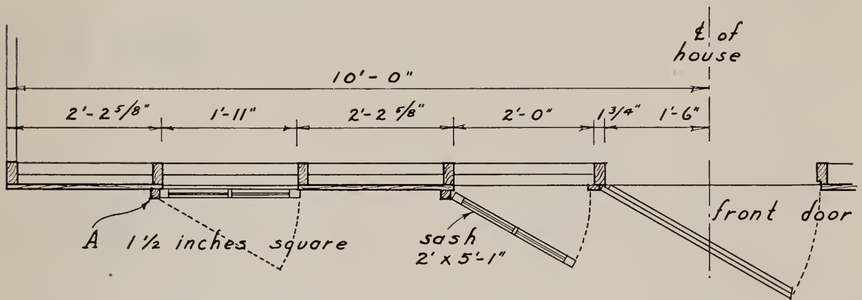


Fig. 16. Construction detail for glass window sash, showing location of front wall studding and sash, and methods of installation. The hanging-strip A extends the full height of the sash on the hinge side and across its top.

Glass Window Sash. Glass window sash on the poultry-house front offers the most secure protection against winter storms and cold winds. From late spring until early fall, when the house front may remain more or less open, the sash may be removed entirely and stored.

Sash that swing out and lay back against the house front, in the open position, are recommended. The full opening is then available for direct sunlight during the hours of sunshine in the winter months. See figures 15 and 16.

Four sash, each 2 feet wide by 5 feet 1 inch high (stock size) to each 20 feet of house front will provide sufficient light for the birds. For economical installation, the sash should be hinged to a wooden strip that will permit them to lie against the face of the house in either the closed or open position. This type of construction eliminates window sills and provides a storm-tight front.

Glass Substitutes. Glass substitutes admit some ultraviolet light and are being constantly improved. They have not in the past proved more durable than muslin when used throughout the year.

Ventilation. Ventilation that can be regulated is provided for by the open front, by windows and openings in the rear wall, and by openings between rafters over the rear wall; openings between rafters over the front wall also serve for ventilation, but these are fixed openings.

The flow of air between rafters over the rear-wall plates is regulated by baffle boards hinged as at *A*, figure 17. Three boards to each 20 feet of house are recommended. The center board permits passage of air between three rafters, or the center 4 feet of the house; the two remaining boards control 8 feet of opening on each side of the center.

In the colder parts of the state, it may be necessary to provide a hood over the roosts to conduct the air from the rear opening between the rafters toward the center of the house and prevent it from flowing directly downward upon the birds or creating injurious drafts. Such a hood is made by sealing the underside of the rafters with fiberboard, or plasterboard, or tongue-and-groove lumber. The width of hood extending outward from the rear wall is dependent entirely upon the velocity and movement of air as it enters the house; usually a 2-foot width for the 4-foot center baffle only (that is, a 2 × 4 foot hood) is sufficient, although in some localities a hood the full depth of the droppings board may be required, as shown in figure 24. In the winter months, the open center baffle at the rear and the front-wall openings between rafters generally provide adequate ventilation. In extremely cold weather, the baffle may be closed. On mild winter days, the front curtains or sash may be opened to admit direct sunlight. In the summer, the front and all baffle boards and windows may be opened.

In the interior valleys, on the other hand, the opening between the rafters, and the rear windows below the roosts, may not give adequate ventilation during hot weather. For such climates, a dropped hinged door across the entire width of the rear wall of the unit may be provided, as shown in figure 18. The space between the rafters is sealed, and a hood is not used, of course; the door is simply closed during cold weather.

The means are thus provided to regu-

Ventilators

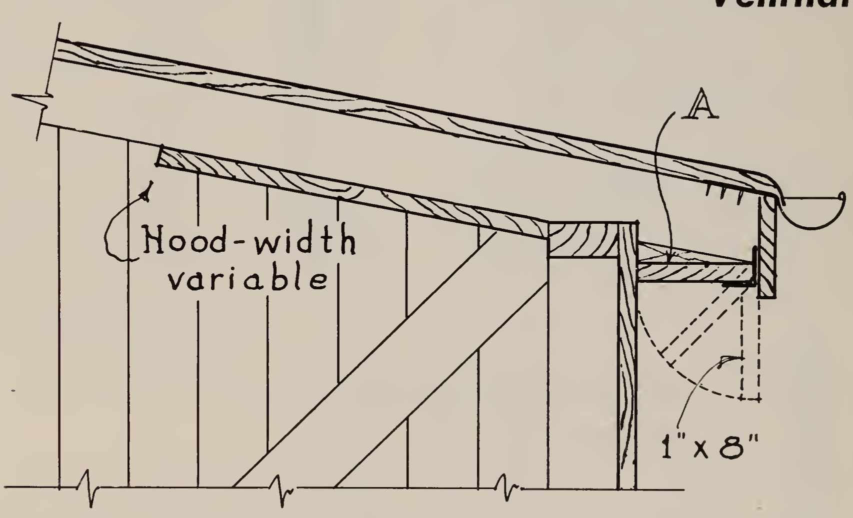
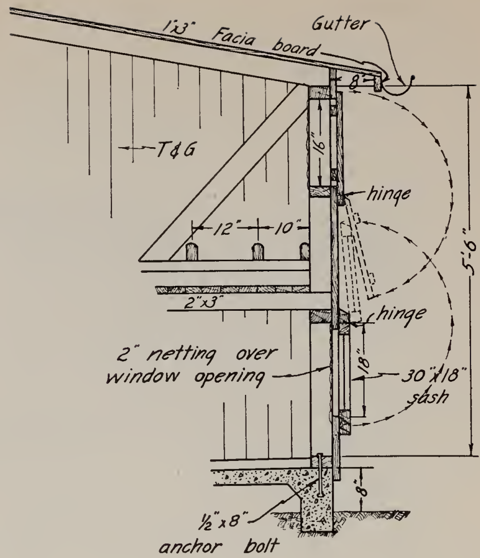


Fig. 17. Detail for constructing ventilators above rear-wall plate and between rafters. Baffle board is hinged at A. In some climates it is necessary to install a hood over the roosts to conduct air to center of house. Width of hood will vary with climatic conditions. Hood may be of fiberboard, plasterboard, or tongue-and-groove lumber.

Fig. 18. A dropped hinged door across the entire width of the rear wall may be needed for ventilation in some climates. In this section drawing the opening is 16 inches high. The doors may be made any convenient length.



late ventilation as local conditions and seasonal changes require; and poultrymen may determine for themselves the most satisfactory way to regulate these openings for their region.

Results of tests conducted over a two-year period indicate that moving the droppings board 6 to 8 inches forward of the rear wall to create a circulation of air about the roosting area on still hot nights did not seemingly have any beneficial effect upon the birds; nor were there any noticeable changes in the house temperature about the roosting area.

Fowl Door. The fowl door is usually placed near the corner of each pen so that birds can be driven more easily out of the house into a catching coop set against the outside of this door. A door opening 10 to 12 inches high and nearly as wide as the end of the catching coop should prove more convenient than a smaller opening when using the coop in culling, transferring, etc. The door is made ½ inch larger all around than the opening, and slides in wooden guides. A center cleat on the door keeps it from warping and serves as a hand-hold. Figure 19 shows the construction of a small fowl door that slides up and down and figure 20 that of one that slides sideways. These doors can be made any size desired.

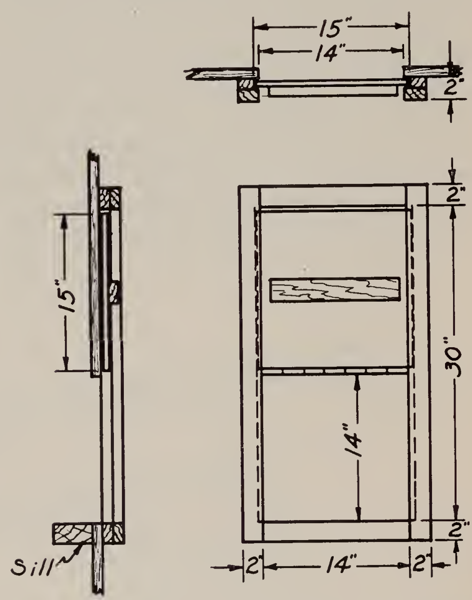


Fig. 19. Method of constructing a fowl door that slides vertically.

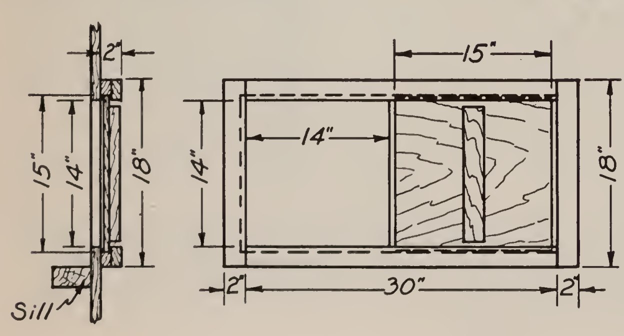


Fig. 20. Method of constructing a fowl door that slides horizontally.

Partitions. Each partition between pens should be made solid to the top of the partition door header, with 2-inch mesh wire netting above. This construction helps prevent cross drafts on the floor and over the roosts but allows free circulation of air under the roof—an important consideration in summer. (See figure 26.)

Where the partitions are to be boarded up horizontally, partition sills can be omitted if short lengths of ½-inch iron rod or ½-inch bolts are set in the concrete floor and the projecting ends inserted snugly into holes bored in the ends of the partition studs to hold them solidly in place.

When a partition is omitted to increase the size of pen, that portion from the rear wall to the front edge of the droppings board should remain. It helps prevent cross drafts.

Hanging Double-swing Partition Doors. There are a number of ways of hanging double-swing doors, but one satisfactory and inexpensive method is shown in figure 21. Two or three strap hinges, 4 inches in size, are attached to a light door on the side opposite to that on which they would ordinarily be attached. They are then fastened to the door frame in the usual way. With this method of attaching the hinges, the door is not flush with the frame but is offset its own thickness. It will open 90° in each direction and give a full-door opening for the passage of a litter carrier. To work properly, the partition door should be made of very light material, such as ½-inch resawed lumber.

To make it self-closing, coil door springs ⅜ inch in diameter and 16 inches long are attached by one end to the top of the door on each side and at the other end to an adjacent rafter.

A screen-door closer with a strong spring attached to each side of the door frame 16 inches higher than the front edge of the droppings board serves to hold the door closed when it is brought back to the closed position by the coil springs.

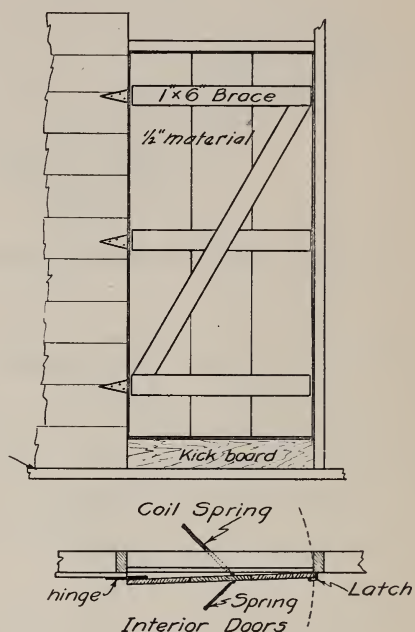


Fig. 21. Plan for the construction of double-swing partition doors.

Droppings Boards, Roosts and Pits. The use of droppings boards has been discussed previously on page 5. Details of construction are shown in the plan in figure 26, and in cross section in figure 27. The 1 × 4 inch tongue-and-groove lumber used for the droppings boards should run lengthwise of the board; for, if it should cup slightly, due to dampness, the board is easier to clean in this position than if the boards were laid in the opposite direction. Suitable plywood panels may be used for droppings boards.

(Turn to next page for detail drawing.)

Hinged Roost

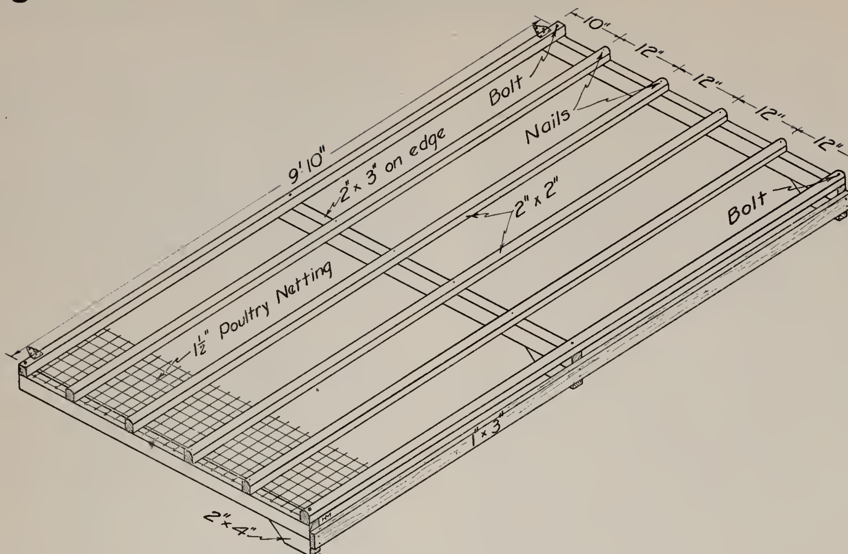


Fig. 22. Detail showing construction of a section of roosts with wire netting stretched under them.

The section of roost, shown in figure 22, is hinged to the rear wall of the house. All roosts should be approximately the same level. The 1½-inch-mesh netting is placed directly under the roosts and on top of the 2 × 3 inch roost supports. A strong, rigid section may be obtained if the front and rear roosts are bolted to the supports.

The dropping pits in use vary considerably according to the construction of the house. Some allow the droppings to fall on the floor and permit birds access to them, but a more sanitary procedure is to prevent access of the birds to the area under the roosts.

For houses with full concrete floors the roosts may be placed about 12 to 14 inches above the floor, and roosting sections made removable or hinged at the back to facilitate cleaning.

Where the pits are to be cleaned from the outside, the roosts should have at least a 2-foot clearance as shown in figures 33 and 34. Less clearance will interfere with cleaning.

PAINT AND PRESERVATIVE

Paint is of great value in preserving building materials exposed to rain, sun, and wind from the destructive action of weathering. In addition, painting tastefully done adds attractiveness and distinction to the property.

The durability of a paint for any given purpose depends upon its composition. Its wearing qualities, however, may be materially influenced by the condition of the surface to which it is applied as well as by other conditions to which it is exposed. A paint containing low-grade pigments and oils cannot be expected to be as durable as one composed of high-grade materials. On the other hand, a high-grade paint may wear poorly because the surface to which it is applied is oily or smeared with pitch from resinous knots, or similar materials, so that there is only a weak bond between the paint and the surface covered. Good results also cannot be expected in general from paint used on surfaces exposed for considerable periods to moist conditions.

Directions for thinning and applying ready-mixed paint are usually given on the container. These directions should be carefully followed if best results are to be obtained.

Preservative Treatments for Farm Timbers. Preservative treatment of a considerable portion of the wood materials used on the poultry farm will lengthen their life and thus appreciably lessen the frequency with which replacements have to be made. The use of preservative treatment on the farm has, in the past, been largely confined to fence posts. The same satisfactory results, however, may be obtained with other classes of material, such as the sills of outbuildings, where the cost and difficulty of replacement is so much greater than with fence posts.

The essentials of a good wood preservative are about six in number: it should destroy all fungus growths which cause wood to decay, remain liquid at ordinary temperatures, penetrate at least the outer surface of the wood, be permanent to the extent that enough remains to give continuous protection, be safe to use, and be reasonable in cost.

Coal-tar creosote is one of the best preservatives known for the treatment of wood. For brush application or open-tank treatment, a high-boiling, refined grade of creosote should be used. In making this product, the more volatile parts which evaporate at a low temperature and the naphthalene crystals which cause the crude creosote to solidify at about 50° F are removed. The commercial creosote used for the pressure treatment of railroad ties and large timbers is not suited to the brush, open-tank, and dipping treatments.

The open-tank process consists of heating the wood in the preservative for an hour or more at a temperature of approximately 200° F. It is then transferred to a tank of cold oil having a temperature of not less than 50° and left for an hour or more. The hot-oil bath opens the pores of the wood and the sudden cooling on transfer to the cool oil brings about an increased penetration of oil into the wood. Instead of using a cool bath, similar results can be obtained by leaving the wood in the hot bath and letting it cool, but this takes longer. With the open-tank treatment, it is desirable to have the sapwood entirely penetrated with the oil. This, however, cannot always be accomplished. A penetration of ½ to ¾ inch will give very good results, and even lighter penetrations will give sufficient protection to amply pay for the cost of treating. If the penetration is insufficient, the period of treatment in the hot bath should be increased. If too much oil is absorbed, the time in the cool bath should be shortened.

The dipping process consists of heating the wood in refined creosote for 15 minutes or longer. This causes all checks and defects to become filled with oil, but the penetration and absorption may be slight as compared with the open-tank method.

The brush treatment consists of applying two liberal coats of hot (at least 150° F) refined creosote to the wood. The oil should be flooded over the wood rather than painted on and the run-off should be caught in a pan. The first coat should be thoroughly dry before the second coat is given. Only thoroughly seasoned timber should be treated by the brush method; sufficient penetration and absorption of the preservative to make the treatment worth while will not be obtained with green timber.

For more detailed information on the preservative treatment of fence posts and other building materials on the farm, the reader is referred to Farmers' Bulletin 744.[2]

[2] Hunt, George M. The preservative treatment of farm timbers. U. S. Dept. Agr. Farmers' Bul. 744:1–34. Revised 1928.

Floor Plan

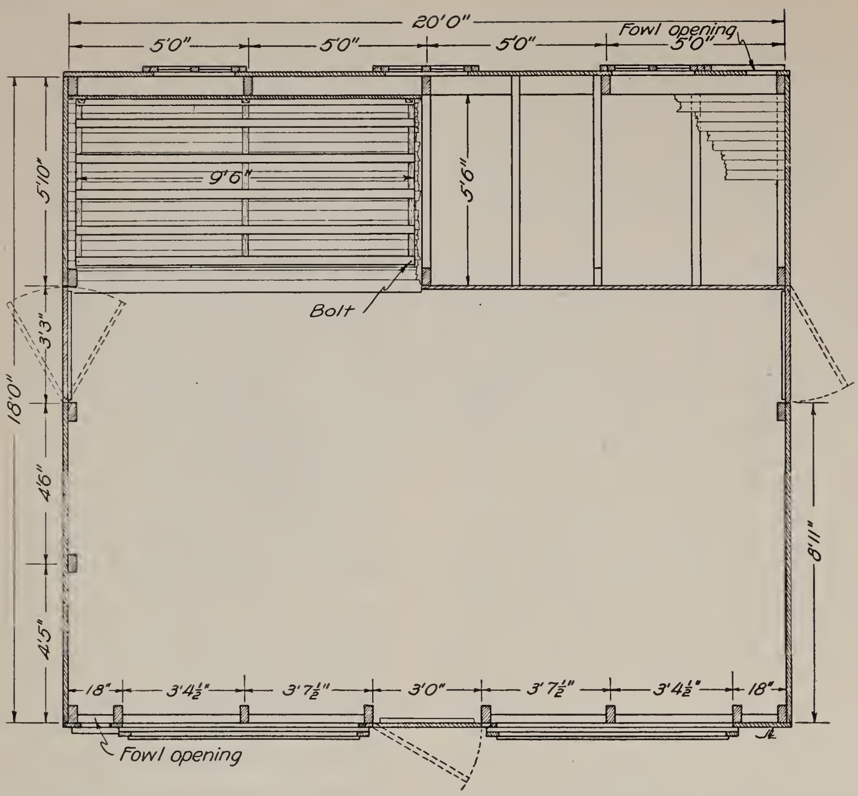


Fig. 23. Floor plan of one 20-foot section of the commercial laying house. At left is shown partition construction, and at right the end-wall construction.

Front Elevation

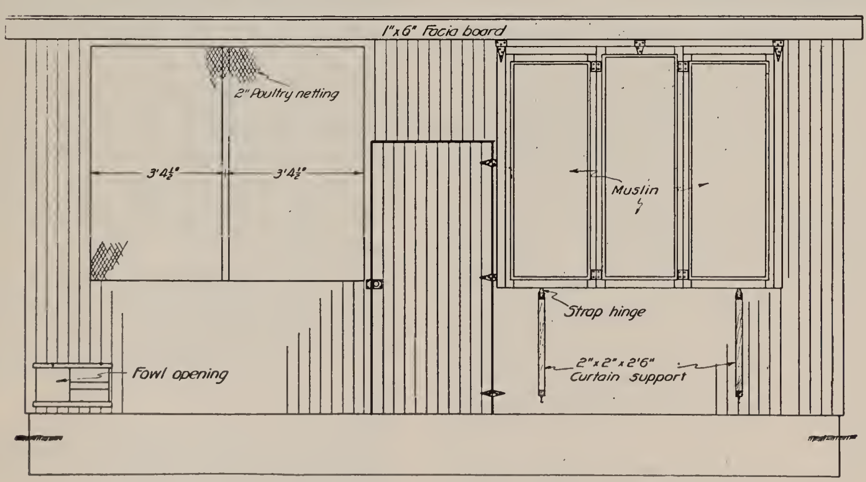


Fig. 24. Front elevation of a 20-foot section of a commercial laying house.

A COMMERCIAL *Laying House*, WITH VARIATIONS

The laying house described here and shown in figures 23 to 31 has been designed to meet the requirements of poultry keepers operating on a commercial scale. It is 18 feet deep and the rear studs have been made 5½ feet long in order to raise the roof sufficiently high to provide ample head room for hanging a litter carrier just in front of the droppings board. (See interior view in figure 26.) Each partition wall has a double-swing door that will allow the passage of a large litter carrier. The front door in each pen provides ready access to the yard to operate the curtains, remove litter, and look after birds.

Back Elevation

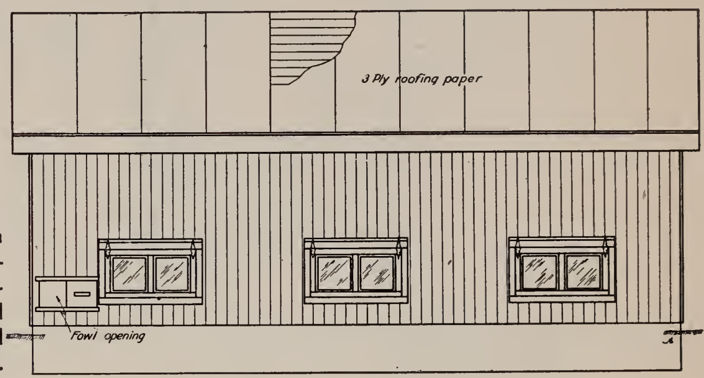


Fig. 25. Back elevation of the commercial laying house, showing location of windows and fowl door, and method of laying roofing paper.

Interior View

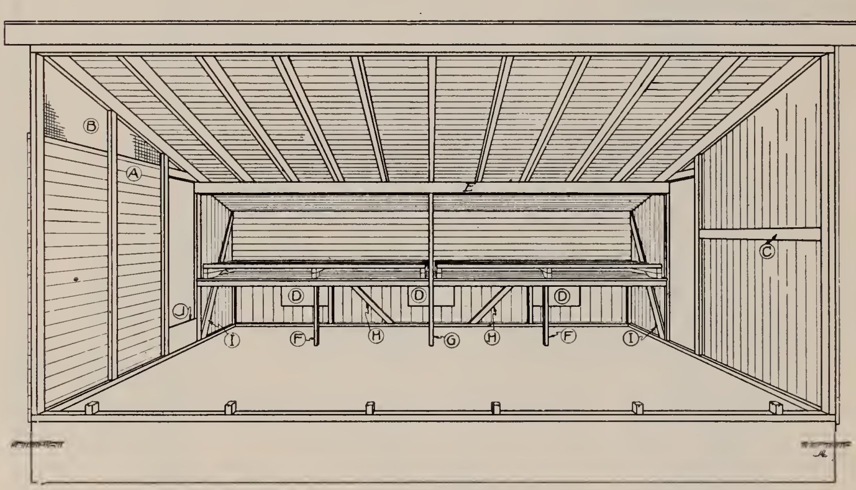


Fig. 26. Interior view of the construction of the commercial laying house, showing at left the partition construction and at right the end wall. A, horizontal siding used in partition. B, 2-inch-mesh poultry netting above. C, rail can be dropped low enough to act as rest for side-wall nests if desired, and another 2 × 4 inch rail inserted above the nests. D,D, rear windows. E, 2 × 6 girder supporting rafters and serving as support for litter carrier. F, front legs of droppings boards. G. center support of droppings boards extends up to support girder. H, I, braces in rear wall and end wall. J, removable kick board in the partition door frame, over which the door swings to keep it clear of litter.

Cross Section of Laying House

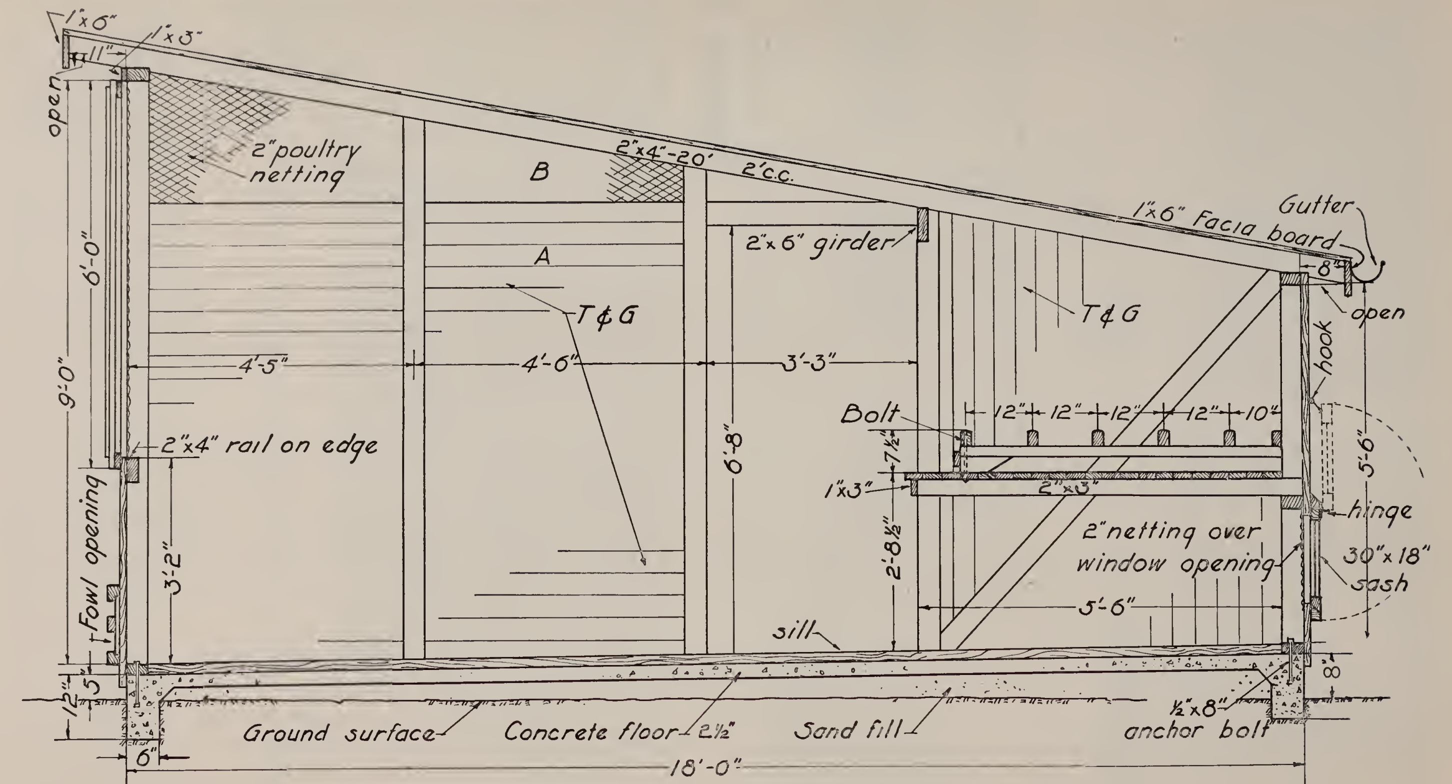


Fig. 27. Cross section of commercial laying house through partition. Note horizontal sheathing in pen partitions to door height with 2-inch-mesh netting above. Concrete floor has a 3-inch slope from rear to front.

Foundation Detail

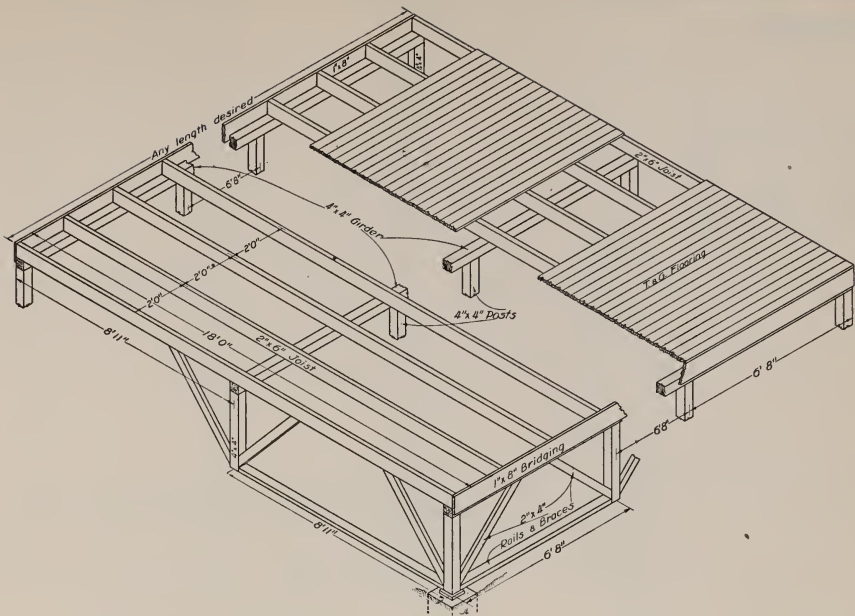


Fig. 28. This method of constructing foundation and floor is used where the ground slopes so much that a concrete foundation and floor would be too costly.

Framing Detail

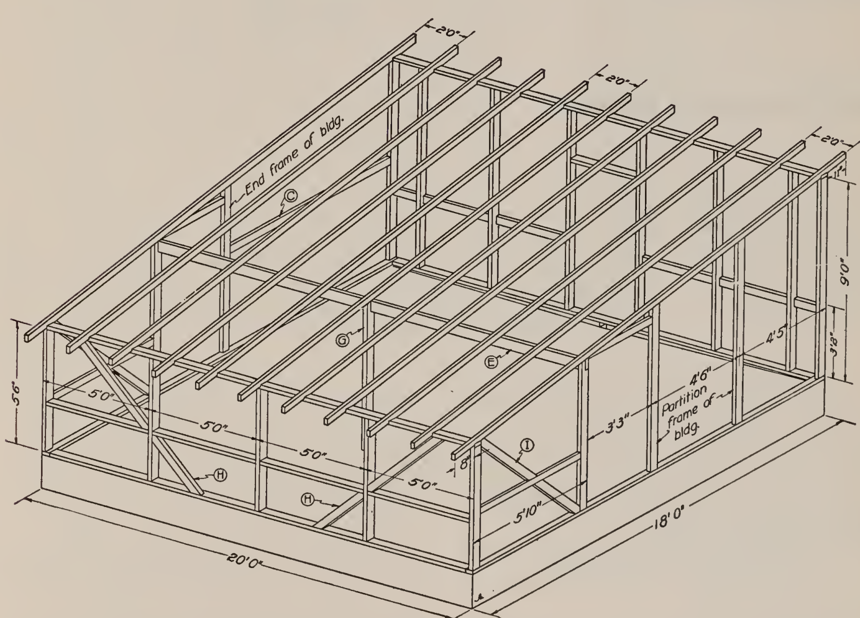


Fig. 29. Framing details of a 20-foot unit of the commercial laying house.

Curtain Details

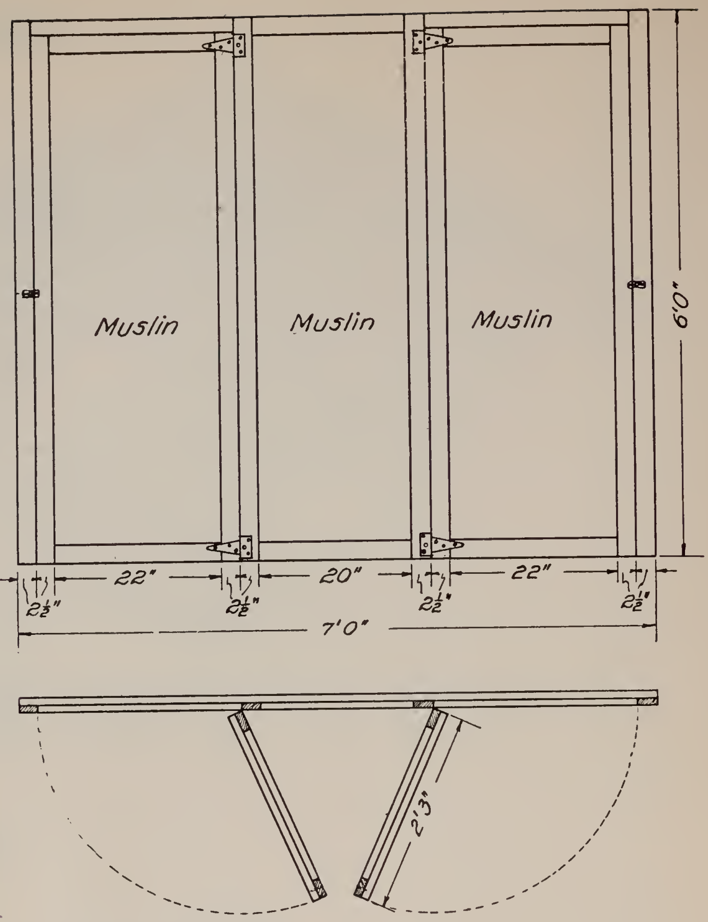


Fig. 30. Detail of curtain for commercial laying house. Additional details are shown in figure 12.

Modifying the House

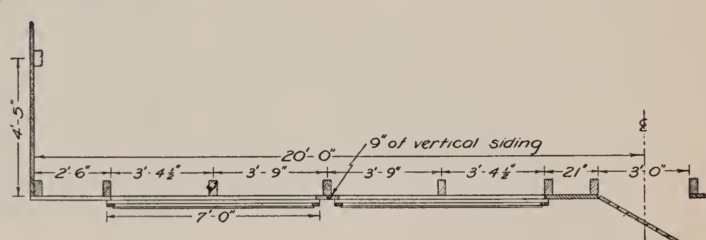


Fig. 31. Detail at right shows changes in wall framing and changes in the location of curtains.

In constructing the house with pens 40 feet long, a change is necessary in the framing of the front wall if but one door in the center of each 40-foot section is desired. This is shown in figure 31. All other dimensions remain the same as for the house with 20-foot sections, shown in floor plan figure 23.

Widening the House. In practice there are numerous modifications of the commercial laying house illustrated. Widening the house to provide larger units has proved popular in certain sections of the United States where cold weather protection in poultry houses usually makes them more expensive than poultry houses in California. Wide houses, apparently have given satisfactory results in California as measured by the performance of the birds kept in them, but probably have not given far better results than other houses. However, adequate comparative data are not available.

When a wide house (24 to 30 feet) is built, the construction of the wall need not be basically changed. However, if a shed roof is used, the front wall will be much higher, and additional roof supports are required. To avoid the high front wall, most wide houses have combination or gable roofs.

Adding Wire Porch. A wire porch has also been added to the front of the house to increase the capacity of the ordinary 18 or 20 feet wide shed-roof house. This is illustrated in figure 32. Two feet is about the minimum space needed to clean conveniently under a porch four feet wide. The only change made in the front is to remove the wire and boards from the upper two thirds of the front (figs. 24 and 27).

Such wire porches are used in various ways, the commonest being to place the roosts on them, thus having the roosts with an outside dropping pit at the front of the house. This leaves the entire floor free for feeders, waterers and nests.

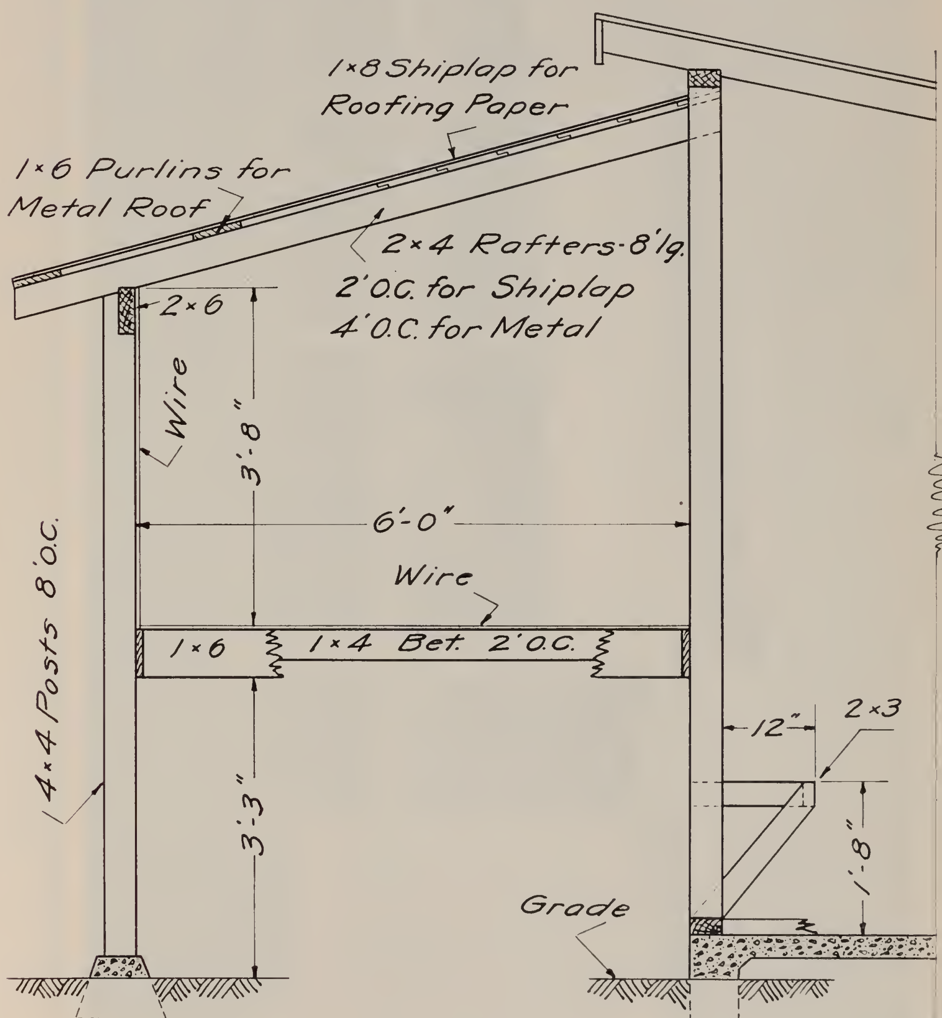


Fig. 32. Cross section of a wire porch attached to a shed roof laying house similar to the one shown in figure 27. The lower part of the front wall need not be changed to build this porch.

Example of Double Wire-Porch Laying House

Fig. 33. Double wire-porch laying house with shed type roof and small feed room at end. Note waterers and feeders on the front porch. A curtain operated by a single lift rope and handle as shown in figure 14 could be used in place of the six curtains.

DOUBLE WIRE-PORCH HOUSE

A still further change toward more wire on the floor and less wood or concrete is shown in figures 33, 34 and 35. The roosts are shown at the back, while feeders and waterers are at front on the wire. Nests can be placed either lengthwise at the front or crosswise at intervals. The equipment should be so placed that it is not necessary to walk on the wire. With this arrangement, most of the droppings fall through the wire and are cleaned out from the back and front. The center floor is raised off the ground, which helps to keep it dry. Concrete center floors can be built on the ground if preferred.

The construction of the walls can be varied to suit local conditions. The walls actually used on this type of house vary from all wire to wood and windows or curtains. The roof may be combination, gable, or shed, as shown in the figures.

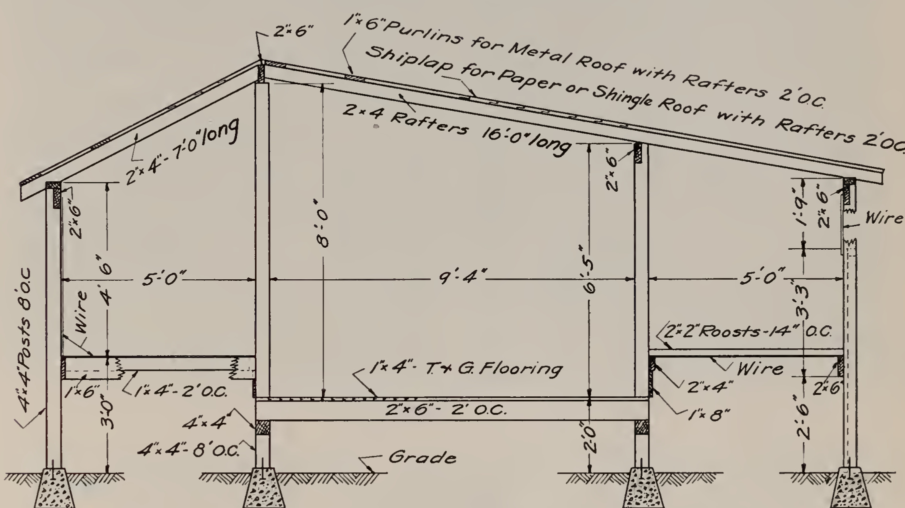


Fig. 34. Double wire-porch laying house with combination type roof.

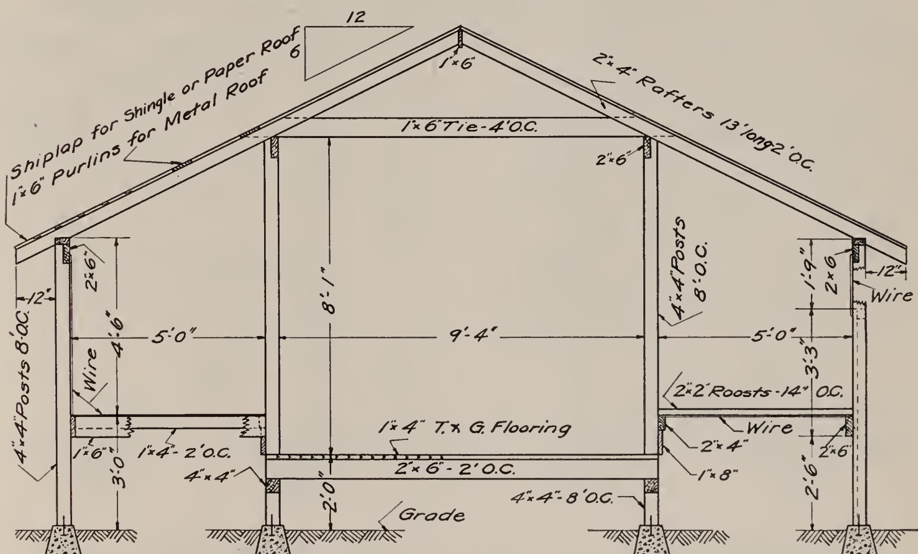


Fig. 35. Porch house with same dimensions but with gable roof.

WIRE-FLOORED HOUSES

The final step toward an all-wire-floor house is shown in figure 36, which represents one of several types in use. This is sometimes referred to as an orchard poultry house because such houses were originally most frequently located in orchards. The pens on each side of the center alleyway are four feet wide to facilitate cleaning. Wider pens up to 6 feet are used, but it is more difficult to handle the birds from the alley and to clean the droppings from under such wide pens. The pens may be made any length. The house length varies according to the length of each section and the number of sections.

There are several modifications of this house in use. These vary from separate sections 2½ to 6 feet wide and 16 feet or more in length, to houses similar in size and height to regular laying houses but with raised wire floors and no other walls than the wire required to confine the birds. Some of the narrower ones are being built with sloping floors like those used in individual cages, thus permitting the eggs to roll to the front and eliminating the need for nests. Obviously, removal of droppings is a difficult problem where wire houses of this type are used. Another reason for building narrower units is to permit the attendant to reach all parts of each unit without entering it. This is important since one of the chief advantages of wire floors, as an aid in preventing the spread of disease-producing organisms, is lost if the attendant has to walk on the wire.

Hens on wire floors usually scratch the litter out of the nests, making it necessary to replace it frequently, hence many use roll-away nests (fig. 74). This difficulty is usually not experienced where all or part of the floor is wood or concrete. On the other hand, well managed all-wire floors should reduce mortality from ground-borne parasites.

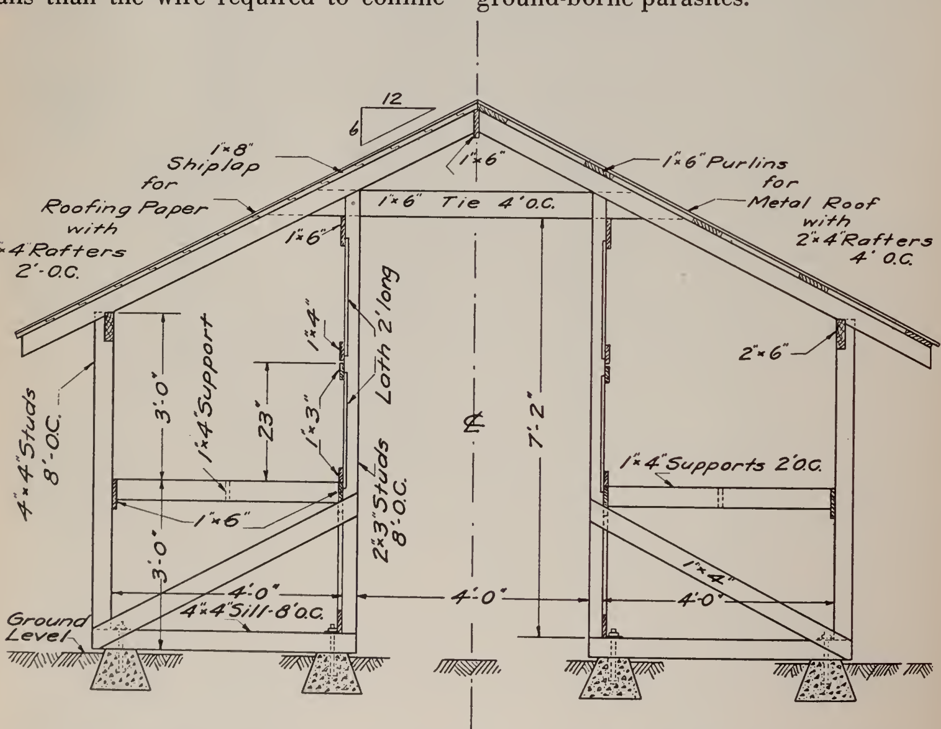


Fig. 36. Cross section showing framing of orchard poultry house. Feeders should be placed in the alley, the waterers and nests on the outside (wire) walls. Birds should be serviced without entering the pens or unduly disturbing them.

Fig. 37. An orchard poultry house which is in use today, showing construction similar to that shown in figure 36.

HEN CAGE HOUSES

The typical cage house used in California is similar to the orchard poultry house in the protection afforded the birds. These are built with two or four rows of individual cages, pictured in figures 38 to 41.

Heavy culling is an important factor in the high production per cage usually reported by those who keep their flocks in cages. A record of the egg production of each hen is usually kept on a card on each cage (fig. 39). Any layer that fails to maintain a satisfactory rate of lay, or fails to lay for 7 to 10 days, is replaced. This means that some pullets are kept throughout the year while some may have to be replaced several times, and culling may amount to 100 per cent for the year. Such heavy culling makes it necessary to have reserve pens of pullets to supply replacements. This in turn necessitates more frequent brooding to avoid having on hand a large reserve of pullets. The reserve pullets are usually kept in outdoor batteries or an orchard poultry house. It is probable that where hens kept on the floor are culled as heavily as those kept in cages, the egg production on a hen-day basis is about the same.

The use of individual wire cages should, in addition to reducing mortality from ground-borne diseases, eliminate losses from cannibalism and give all birds an equal chance to feed and water. The use of individual wire cages will have little effect on mortality from other causes. Egg production is not increased except from a few timid birds that might in a laying house be kept away from feed and water by more aggressive pen mates, and therefore do better in cages.

Unless care is taken to lay out the plant so as to reduce labor, the use of individual cages such as illustrated here is likely to increase labor costs.

Use of Sprinklers

Since heat prostration is sometimes a serious problem where birds are kept in such cages or on raised wire floors, sprinklers are commonly installed to prevent death loss. These sprinklers are likely to be needed where air temperatures rise above 100° F. One type of sprinkler, placed on top of the roof, is pictured in figure 41. It is similar to a lawn sprinkler and wets not only the roof but also some of the ground around the house. Sprinklers may also be placed inside the house, as pictured in figure 42.

Two-Row Cage House

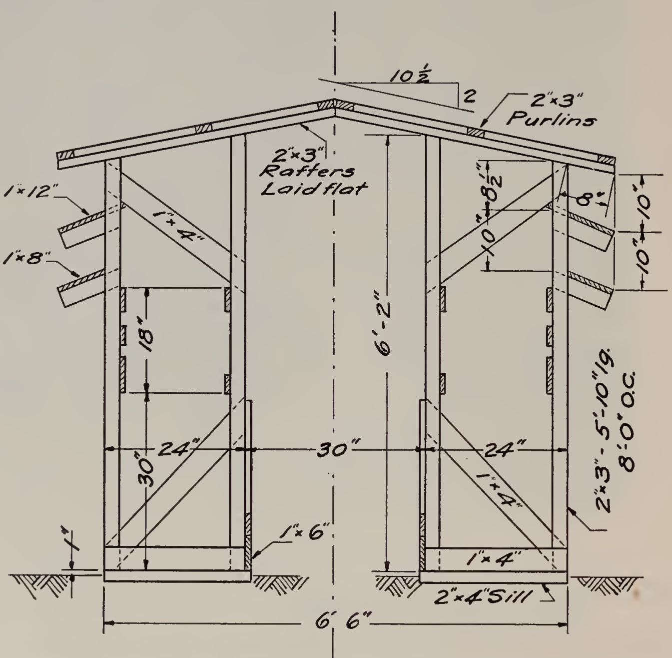


Fig. 38. Cross section showing framing of the two-row, single-tier cage hen house.

Fig. 39. Two-row single-tier cage hen house. Note overhead sprinklers; also tags on fronts of cages on which a record of the egg production of the bird (or birds) in each cage is kept.

Four-Row Cage House

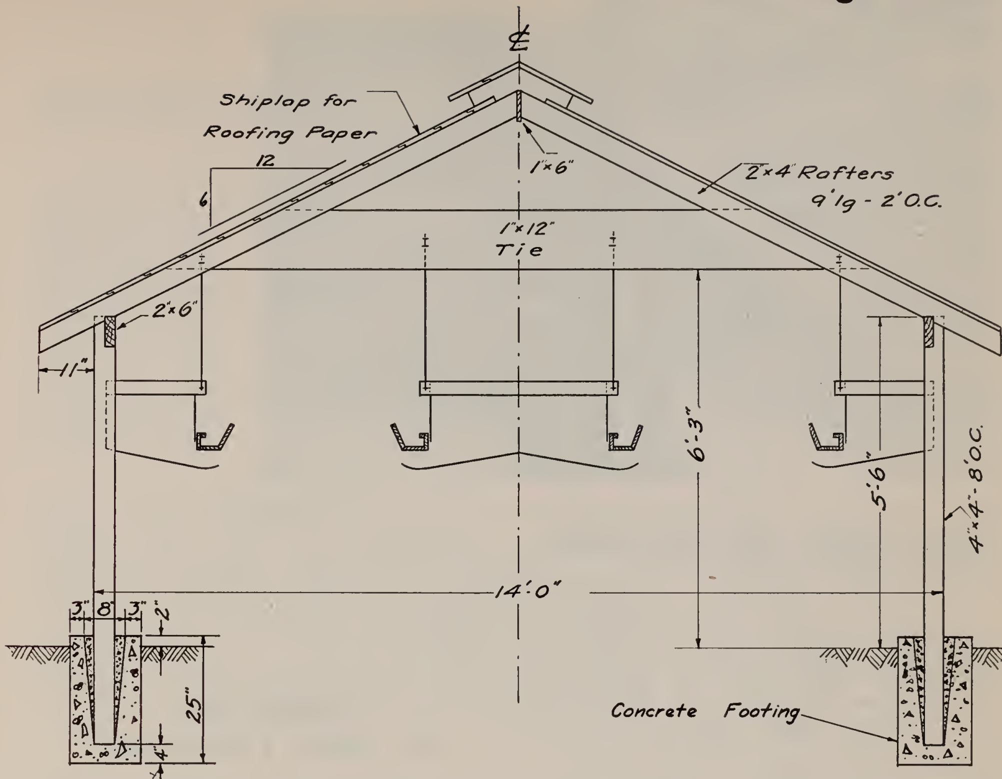


Fig. 40. Cross section showing framing of a four-row, single-tier cage hen house. Note ventilation through false peak and the absence of walls. The cages used vary in size but are approximately 16" high at the back, the top is 18" from front to back and the floor 24" with a slope of 3" towards the front.

Fig. 41. Four-row, single-tier cage hen house. Note automatic drip valve watering system which works well for birds in cages or on wire floors. Note also the sprinklers on roof.

Inside Sprinkler

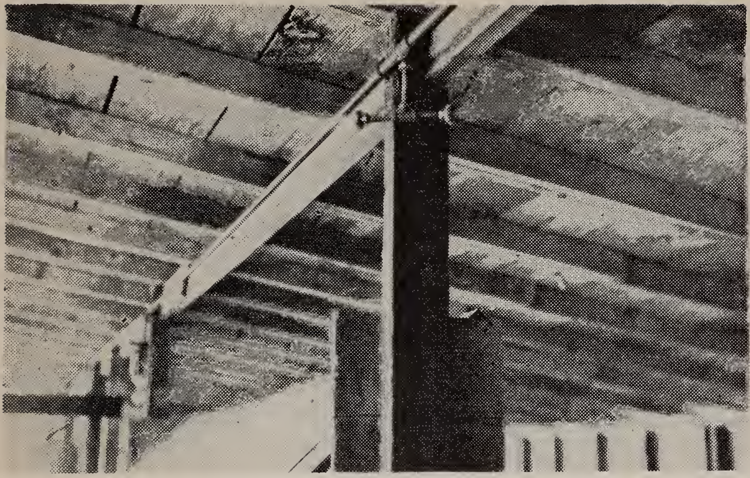


Fig. 42. Indoor spray-type sprinkler. This sprinkler is operated for about 20 minutes at a time, not continuously for several hours. It is not effective unless there is some air movement.

MULTI-DECK HEN BATTERIES

Commercial multi-deck hen batteries are usually installed in houses built for the purpose. The use of such multi-deck batteries increases the cost of housing as compared with ordinary housing methods. The advantages and methods of management would be the same as for individual wire cages noted above. Such estimates as are available indicate that the labor of managing hens in multi-deck batteries is even greater. They should presumably be used only where special circumstances justify their installation.

Wire for Poultry Structures

Wire for poultry houses should be varied according to use. For the floor of the front-porch, double-porch, and orchard house, 1 × 2 inch or 1 × 4 inch 12- or 14-gauge, smooth electric welded wire may be used. The floors of individual hen cages should be 14- or 16-gauge smooth electric welded wire. Heavier wire usually results in greater breakage of eggs.

Where feeders and waterers are on the outside, the wire panels should be spaced according to the size of the birds and made of 11- or 12-gauge smooth electric welded wire. Wire in partitions between pens or cages for mature birds should be spaced close enough (1″ or 1¼″) to prevent fighting. The top is usually made of 1- or 2-inch-mesh 18-gauge chicken netting where a solid metal top or a roof is not used.

HOUSE FOR THE SMALL FARM FLOCK

A single unit of the commercial poultry house is recommended for housing the farm flock of 125 to 150 birds. It may, however, be reduced in size for those desiring to keep a smaller flock.

A house 14 feet deep and 20 feet wide is perhaps more suitable, for the average farm flock of 50 to 60 birds of the heavy breeds, or 60 to 80 birds of the lighter breeds. (See table 1.)

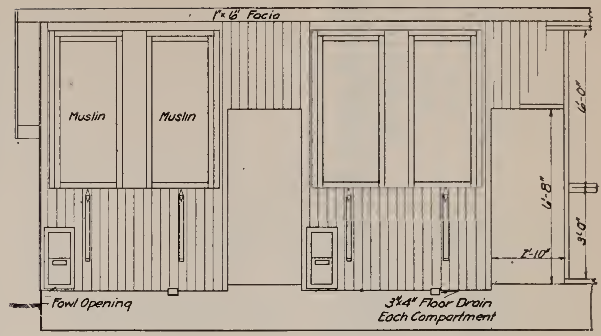
For a house 14 feet by 20 feet, the wall heights as shown in figure 27 may be reduced to 4 feet 6 inches for the rear wall and 8 feet for the front wall. Two doors may not be necessary. If the end door is desired it must be placed nearer to the front wall to obtain head room. The droppings-board depth should be reduced to 48 inches and three roosts provided.

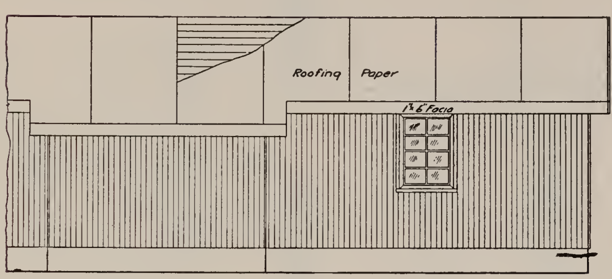
All details shown for the commercial unit should be followed carefully; only dimensions are changed to meet requirements for the smaller house.

Brooding Houses

Front Elevation

Fig. 43. Front elevation of one 20-foot unit of brooder house.





Back Elevation

Fig. 44. Rear elevation of brooder house showing extension of roof over the supply and utensil room.

COMMERCIAL BROODER HOUSE

A special brooder house is not necessary for farm flocks or small commercial flocks. Chicks can be brooded in any building that is sufficiently warm and light. A poultry keeper just starting into the business may postpone investment in a special brooder house by building his laying houses in advance, to brood and rear the chicks that are later to be housed in the same building as layers.

When, however, a brooder house is built, it should be of such design as to save labor and thus make possible obtaining the maximum results in rearing the chicks. The brooder house shown in figures 43 to 47 has been designed to meet these requirements.

Space Requirements. Data compiled by this station have shown that as the floor area per chick is decreased below ½ square foot, and as the number of chicks brooded together in a pen is increased to over 800, other things being equal, mortality increases. Extended observations indicate that the majority of poultry keepers obtain satisfactory results in brooding chicks in lots of about 300.

The brooder pens have therefore been made 14 feet deep and 10 feet wide with a capacity of 280 chicks, or ½ square foot of floor space per chick. Thus in a house 18 feet deep is provided an alleyway of ample width, and pens large enough to accommodate flocks of such size as should prove satisfactory to the majority of poultry raisers. For those wishing to brood in groups larger than 280, some of the partitions can be omitted and two or three pens thrown together. The smaller pens will be found convenient in separating the sexes at an early age.

Floor Plan of Brooder House

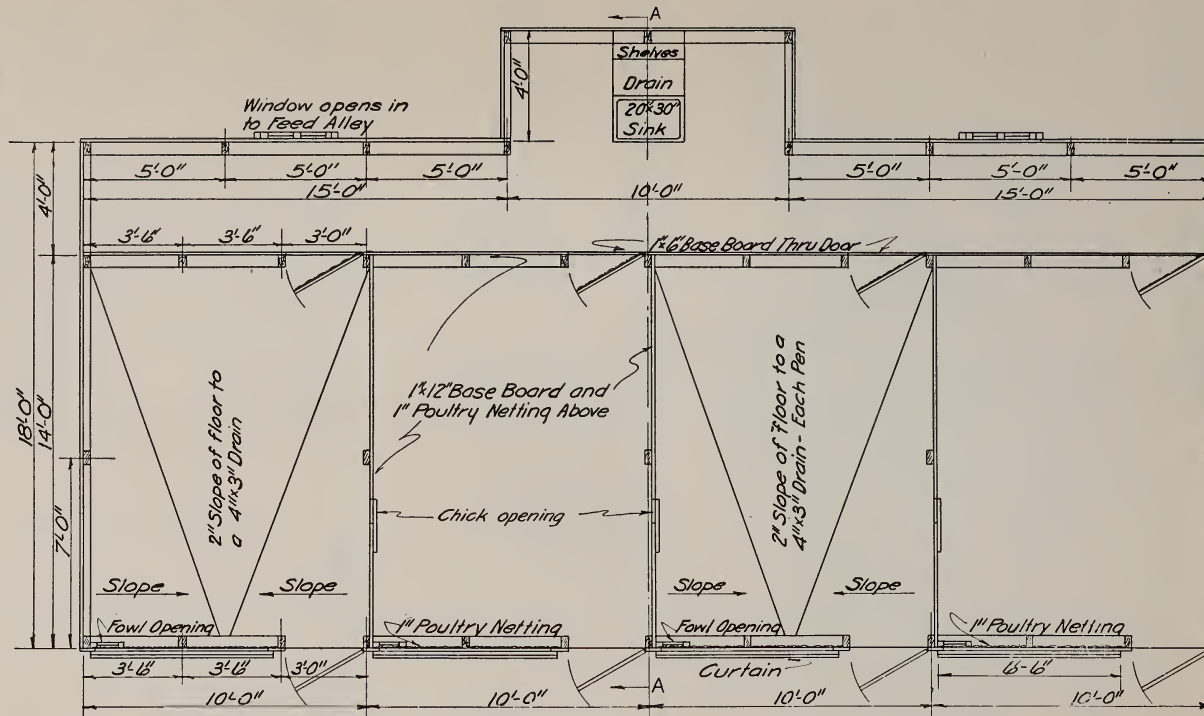


Fig. 45. Floor plan of brooder house. This house accommodates four pens, an alleyway at rear of pens, and an extension at center back for sink and storage space.

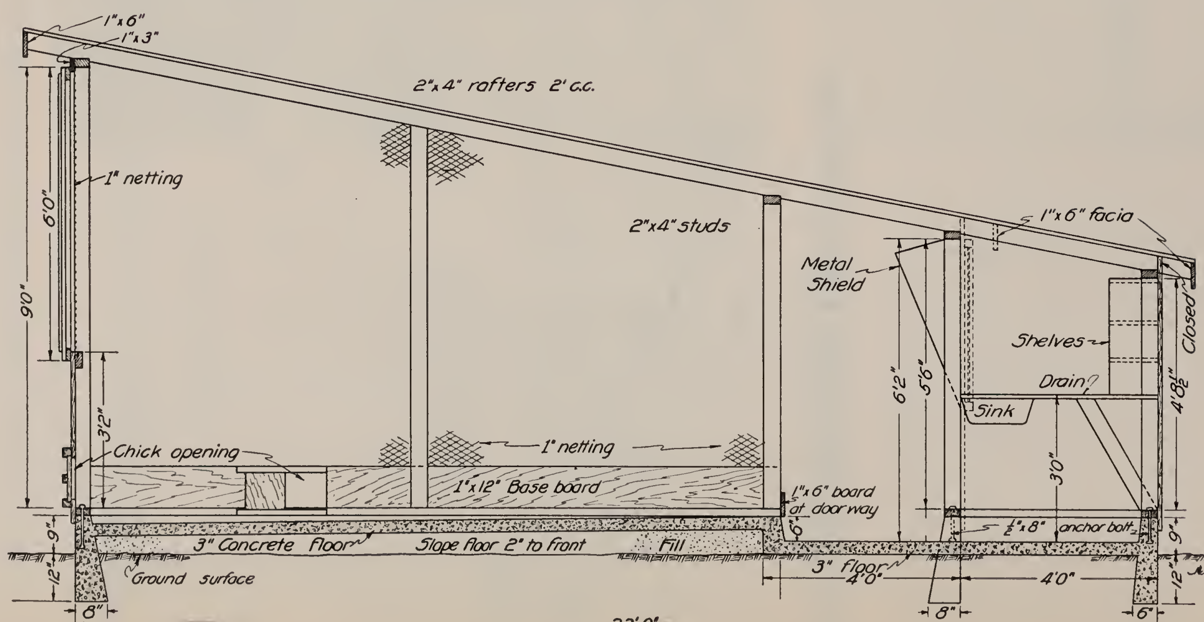
Construction Details. The standard concrete floor is recommended for brooder pens. (See pages 6 and 7.) Such a floor can be easily cleaned as the condition of the litter and the danger of parasitic or other diseases demand. On badly contaminated farms, it may be advisable to cover the entire floor area with wire. Suitable wood frames, usually made of 1 × 4 inch lumber placed on edge, are covered with ½-inch-mesh hardware cloth. These frames should be made in such sizes that they may be conveniently handled, to facilitate removal for cleaning. If the frames are placed in use after the chicks are 4 or 5 weeks old, ¾- or 1-inch-mesh hardware cloth should be used.

An alleyway at the rear is provided; it is one of the most convenient and labor-saving features that can be incorporated into a long brooder house and is, therefore, worth many times its cost. In a house with an alleyway, more frequent trips will usually be made through the house to look at the chicks because such trips can be made with less trouble. This closer supervision will aid materially in reducing losses from toe-picking, accidents, and diseases; feeding and watering can be done more expeditiously; cleaning can be more easily taken care of because any pen may be cleaned without going through or disturbing any other pen.

Head room is obtained in the alleyway by lowering the floor 6 inches below the floor level of the pens. Windows in the rear wall provide both light and ventilation. They open inward from the top and have side shields made of metal, as shown in figure 46, which help prevent drafts.

In the center of each 40-foot section, there is a recess off the alleyway. This recess contains a sink for washing water vessels and utensils, and a set of shelves. It is large enough to hold a bale of straw, a sack of sand, and two or three bins for grain and mash.

(Turn to next page for Curtain detail.)

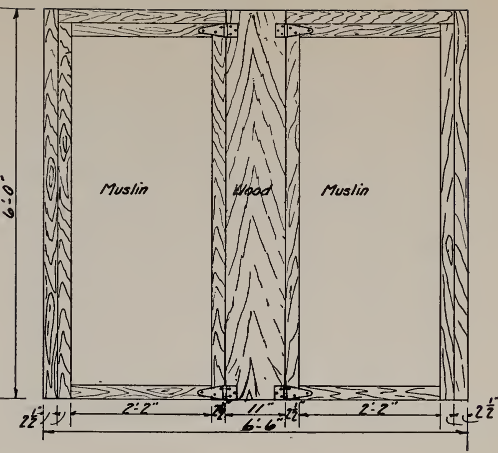


Cross Section of Brooder House

Fig. 46. Cross section of brooder house showing construction of pen partitions.

Curtain Detail for Brooder House

Fig. 47. Details of curtain for brooder house. Curtains as shown in figures 10 or 15 may be used.



Framing Detail for Chick Battery

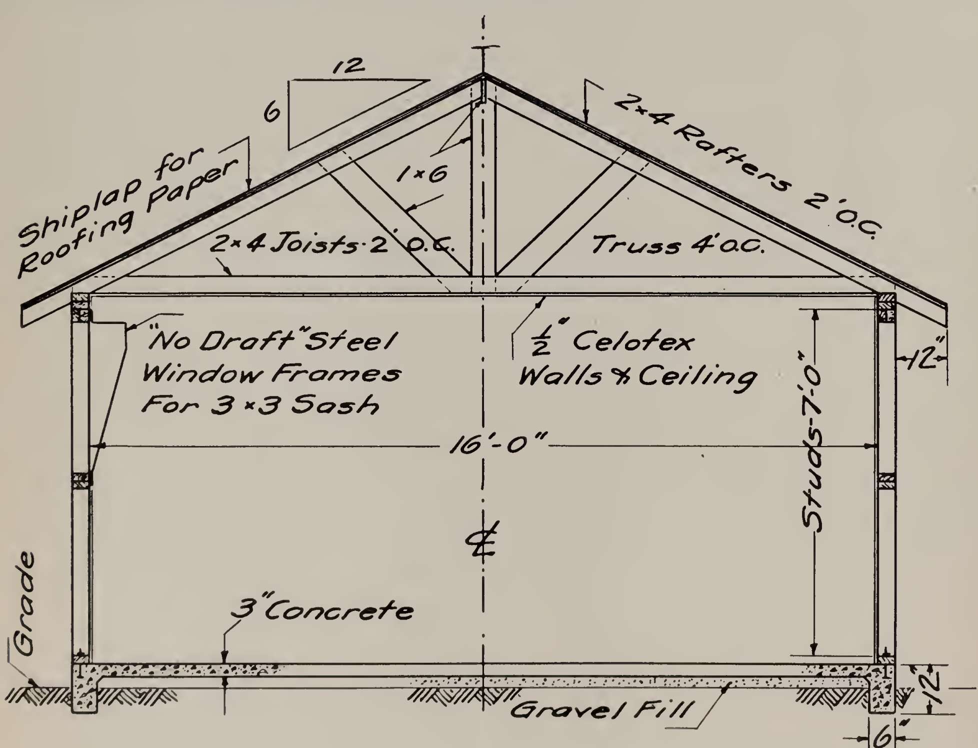


Fig. 48. Cross section showing framing of a small battery brooder room. Ventilation is provided by the four windows.

BATTERIES FOR CHICKS

Many broiler and fryer raisers use batteries to start their chicks. Some use batteries for only the first week, while a few poultrymen keep the chicks in the batteries longer than three weeks or even until they can do without heat. The more common practice is to move chicks to floor or outdoor brooders after the first 12 to 14 days.

The framing of a small battery room is shown in figure 48, and the floor plan in figure 49. For a small room such as this, which will accommodate not more than six batteries, windows opening at the top with stormproof sides provide adequate ventilation. For larger rooms, forced ventilation and supplementary heat would be justified. Supplementary heat may be needed even for small installations unless the heating units can maintain adequate temperature in cold weather.

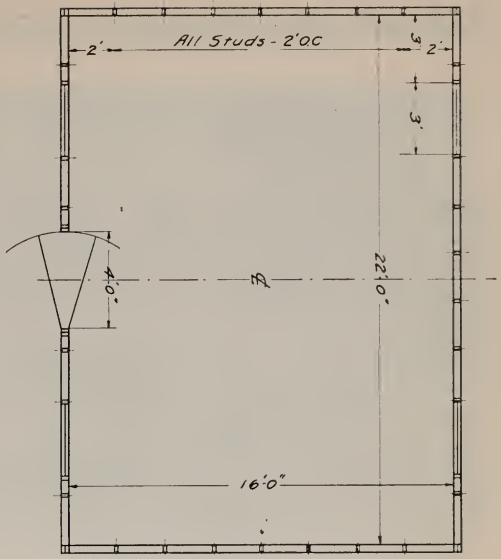


Fig. 49. Floor plan of small battery brooder room.


Fig. 50. A labor-saving arrangement when small brooder units are used.

OUTDOOR BROODERS

Outdoor brooders are suitable for use in some parts of California. The brooders should be spaced and arranged to reduce the work of managing the chicks, otherwise labor requirements may prove excessive. (See figures 50 to 56.) The brooders vary considerably but most of them have an insulated, heated box 4 × 4 feet, and an enclosed wire run 8 feet long or longer. Both the box and run have wire floors, hence the chicks do not come in contact with the ground and the attendant does not walk on the wire. Typical method of ventilating this type of brooder is shown in figure 52.

Where chicks, particularly broilers or fryers, are brooded on wire it is often desirable to finish them for market in unheated outdoor batteries with wire floors. The framing of one of these is illustrated in figures 55 and 56. Such batteries may also be used for fully feathered pullets not quite old enough to go on range, and for older pullets reared as replacements to keep individual hen cage houses filled.

Heated, Ventilated Brooder

Fig. 51. A brooder consisting of heated, ventilated box with wire porch. Drinking cups are in compartments at left.

Ventilating Detail

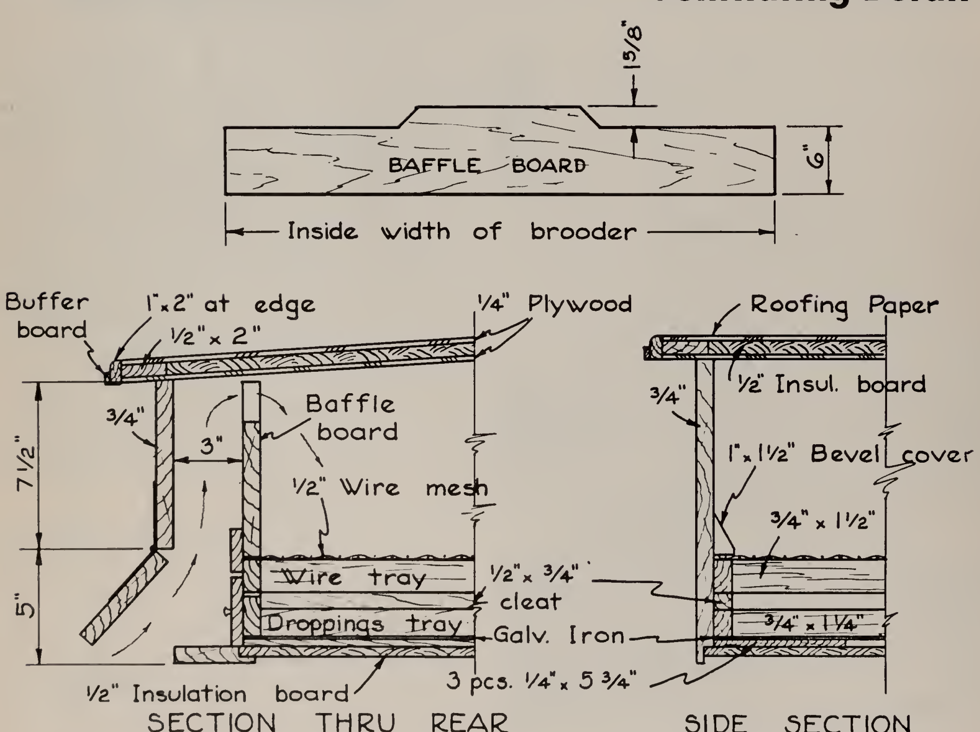


Fig. 52. Detail showing typical method of ventilating an outdoor brooder. Note insulated roof which is needed to help maintain the right temperature in the brooder and save fuel.

Brooder with Unheated Units

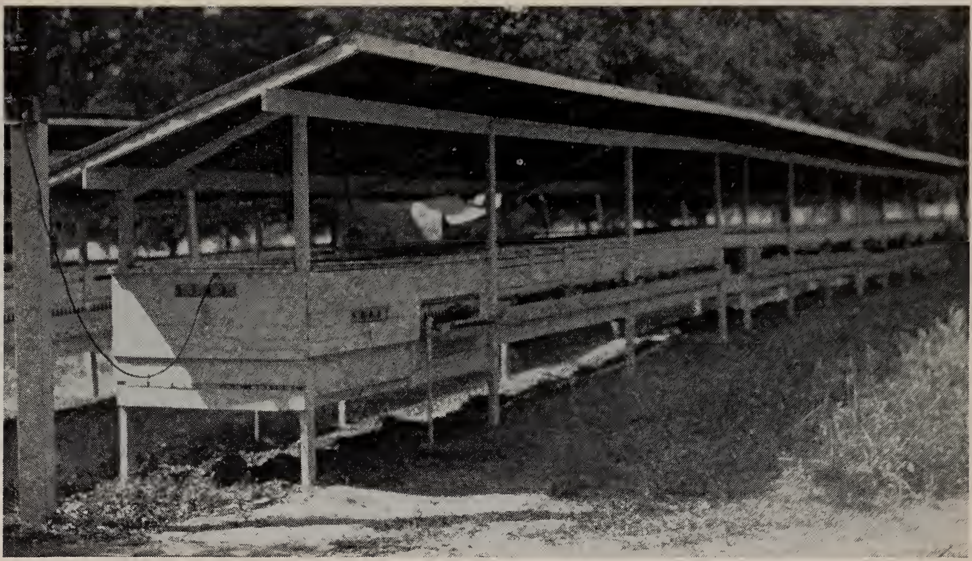


Fig. 53. Outdoor brooder with additional units into which chicks are driven when they no longer need heat. The arrangement saves handling.

Unheated Growing Battery

Fig. 54. An unheated outdoor wire-floored growing battery. Note board used to protect feed from weather.

Outdoor Growing Battery

Fig. 55. Unheated outdoor growing battery. The framing for this battery is shown in figure 56.

Framing for Growing Battery

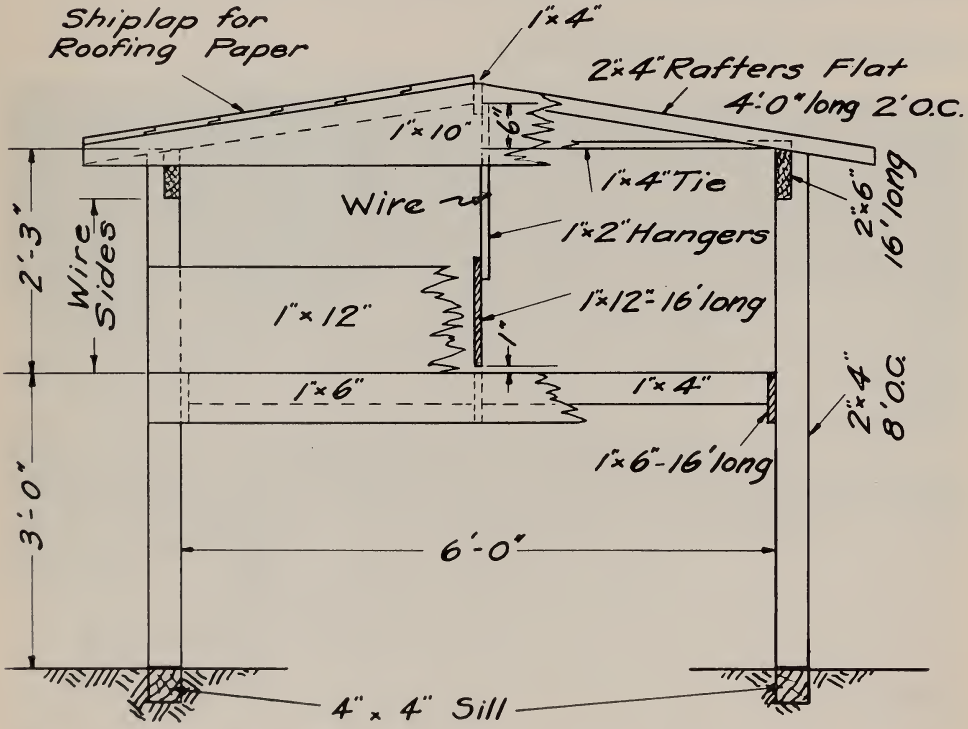


Fig. 56. Cross section showing framing of unheated outdoor growing battery. There is a 1" × 12" board with wire above it in the center to separate the battery into two pens each 3' wide. The sections are 8' long. The battery may contain any number of sections desired. The walls may be wire or lath.

Breeding House

The commercial laying house may be used for flock matings but it is not economical to use such large pens for the small matings used in pedigree breeding.

The breeding house, illustrated in figures 57 to 60, has been designed to take care of matings in which only one male is used. The pens in the house are 10 feet deep and 6 feet wide and will accommodate 12 birds. They may be made larger.

A convenient feature of this house is the service alley at the rear; this saves time because of the frequency with which trap-nest pens must be visited each day, and also decreases the chances of getting birds of different matings mixed.

The door to the service alley may be at one end of the house; or in a long house several doors may be built in the rear. The front door in each pen provides ready access to the yard to operate the curtains as required or to look after the birds there.

Construction details not shown in figures 57 to 60 are similar to those noted for the commercial laying house.

Floor Plan

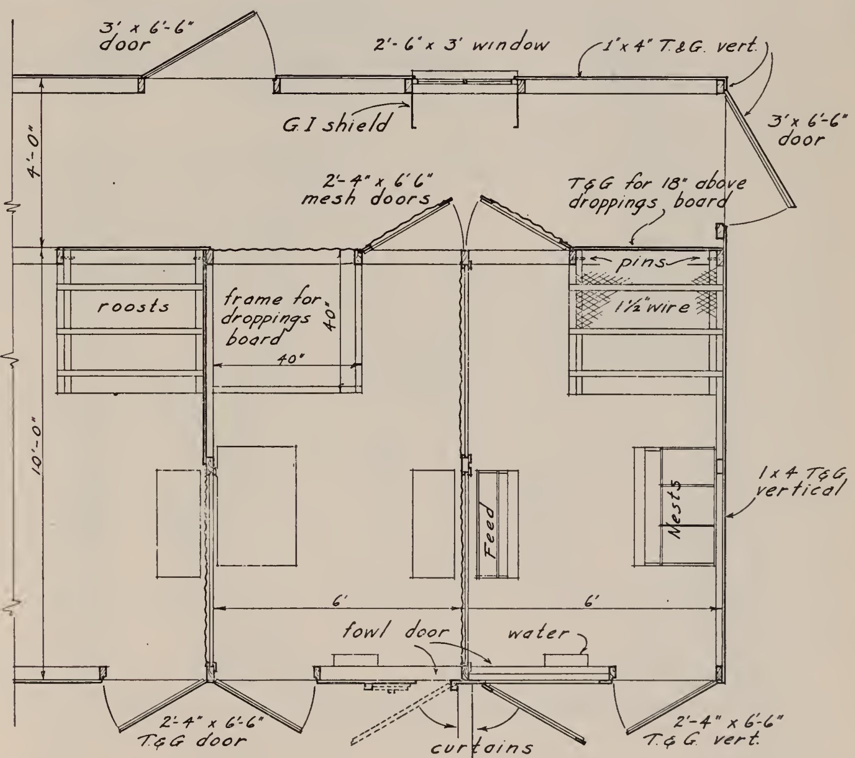


Fig. 57. Floor plan of breeding house showing pens, service alley, and equipment locations. The nests may be placed in the partition and serviced from the alley.

Construction Details for Breeding House

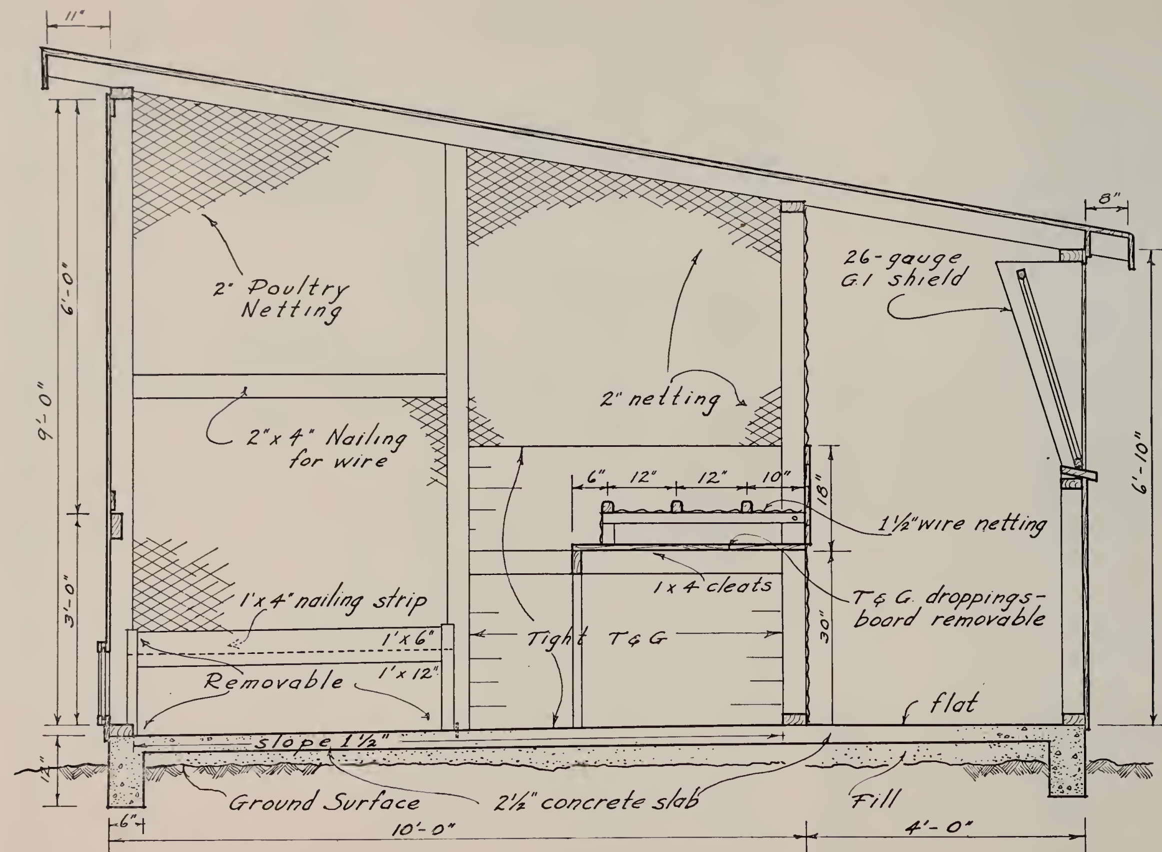


Fig. 58. Cross section of breeding house showing construction details.

Front View of Breeding House

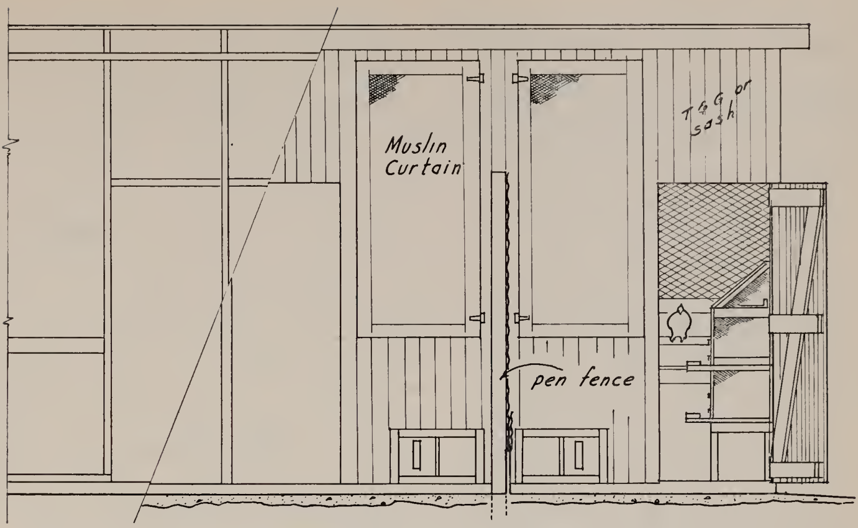


Fig. 59. Front view of breeding house showing at left the framework, and at right the finished front. Interior may be seen through open door at extreme right.

Back View of Breeding House

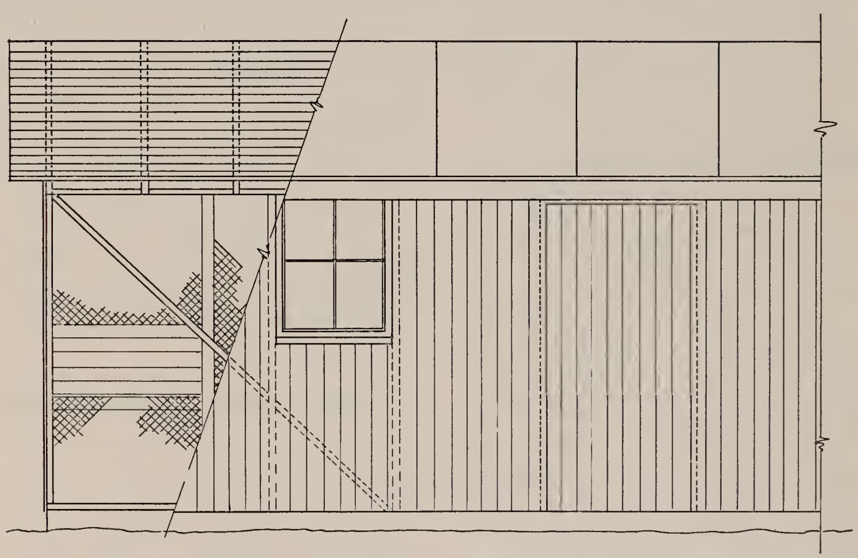


Fig. 60. Rear view of breeding house showing at left the framework and at right the finished rear.

Feed Rooms

Alternatives. The arrangement and size of feed rooms and feed-storage space are matters which must be governed by the objects to be attained and the layout of the poultry plant. For example, one man may prefer a very long laying house with a small feed and work room in the center of each house. This room is designed to care for a two weeks' supply of feed for that house and provide space for appliances. Another favors a two-story structure in the center of each long laying house. He wants storage space for enough straw and certain grains, such as barley, to last from harvest to harvest. Yet a third man chooses to arrange his plant with only moderately long laying houses on each side of a central road; and a small feed room similar to the first one mentioned above is placed on the end of each laying house adjacent to the road. Where small feed rooms are attached to each laying house and additional feed and straw storage is required, a large central building is erected. On other farms, all feed is kept in one centrally located building and no feed rooms are used in connection with the laying houses.

The relative merits of these arrangements for any particular farm will depend on the conditions existing in the area in which that farm is located.

Feed Costs. Price of feed is a consideration. Poultrymen in certain parts of the Central Valley may be able to buy a year's supply of barley, wheat, and straw at low enough prices after the harvest, to represent a saving, even after adding all the carrying charges, over the cost of equivalent grain purchased from month to month. But poultrymen in another locality might find month-to-month buying the cheaper. Interest, depreciation, and insurance charges on the storage buildings, interest and insurance on the material stored, depreciation in grain and sacks from rats, are items that must be considered in determining the economic feasibility of purchasing grain and straw on a long- or short-storage basis. Such data will in turn aid in determining the most economic method of handling these materials on any particular poultry farm.

Rodents. Irrespective of whether feed and straw are purchased to meet the needs for a number of months or for only a week or two, the buildings and rooms should be made as rat- and mouseproof as possible.[3] The economic losses occasioned by these pests and the menace of their presence through their disease-bearing potentialities amply warrant every effort to eliminate them from the premises.

The feed room should be centrally located in relation to the stock fed. and on a well-graveled driveway that will permit heavy trucking. Such a location facilitates the delivery of feed in both winter and summer, and reduces the distance traveled in feeding the fowls and gathering eggs.

It is with these ideas in mind that the following discussion and illustrative material are presented. The purchase and distribution of feed on a poultry farm is a problem with so many factors entering in that one cannot do more here than offer such suggestions and ideas as will enable a poultry keeper to appreciate that problem better and build more effectively than he would otherwise do.

ONE-STORY FEED ROOM

A plan and cross section of a one-story feed room, 20 × 20 feet in size, are shown in figures 61 and 62. The floor plan shows three doors. Those opposite each other are intended to line up with the doors of the laying house and to provide continuous track and passageway for the litter

[3] See: Storer, Tracy I. Control of Rats and Mice. Calif. Agr. Ext. Cir. 142. 1948.

carrier through the feed room, to the laying pens on each side, when the room is located in the center of the laying house as in figure 13. Only two doors would be needed if the feed room were at the end of the laying house and only one, perhaps, if constructed as a separate building.

The three bins provide considerable space for sacked or bulk feed. For example, the two bins 6 × 8 feet in size will hold 6 tons each of sacked grain[4] if piled

[4] A space 3 × 4 feet on the floor and 5½ feet high = space required for 1 ton of sacked grain, estimating 100 pounds to the sack.

Floor Plan

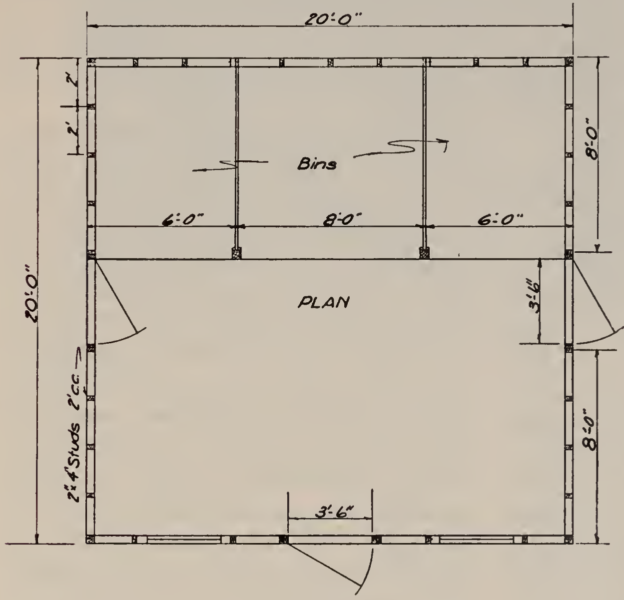


Fig. 61. Floor plan of one-story feed storage room.

Cross-Section Detail

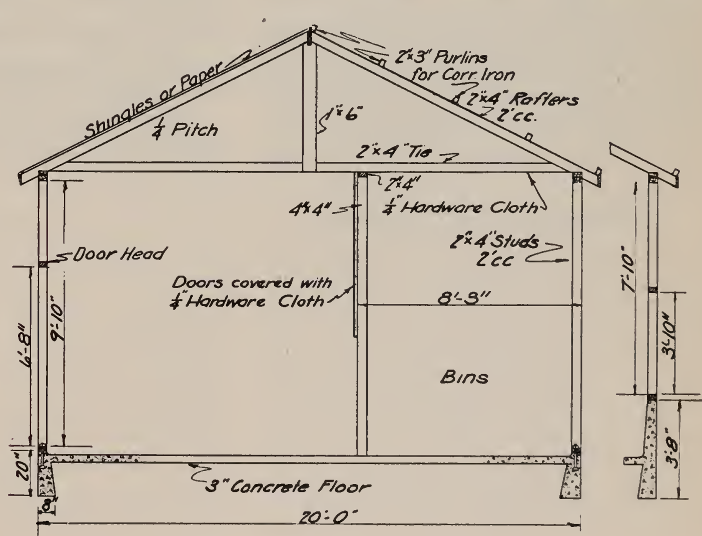


Fig. 62. Cross section of feed storage room.

8 feet high, or an equal amount of grain in bulk when piled to a height of only 4 feet. The large center bin, 8 × 8 feet in size, will hold nearly 8 tons of sacked grain piled 8 feet high. Since mash is usually more bulky than grain, the mash capacity of these bins would be less than for grain. If used to maximum capacity for storage purposes, the three bins are large enough to hold one year's supply[5] of grain for a 2,000-bird flock.

The area forward of the bins should prove large enough to accommodate at least a ton of mash, a green-feed cutter, egg-packing tables, and minor equipment.

BULK STORAGE

The details of construction should be given special attention when a large amount of feed is to be stored. The floor should be well above grade to insure a dry storage area at all times. The studding and side-wall sheathing must be very securely nailed in place and sufficient ties used to hold the framing in alignment and to withstand such side pressure as may be exerted against the walls by the sacked or bulk grain. The bins should be ceiled tightly on the inside if the grain is stored in bulk.

To make these bins rat- and mouse-proof, they may have to be lined with galvanized iron and completely enclosed. Removable panels or frames covered with ¼-inch-mesh hardware cloth (fig. 62) may be inserted to enclose the top and front of each bin.

For commercial poultry farms having a large tonnage of grain in storage, it may prove most economical to store in bulk in overhead bins with the ground floor available for grinding and mixing machines.[6] On any but very large farms, however, it is questionable if the very much heavier and more costly construction required for bulk storage of grain in overhead bins would be compensated for by the greater convenience of such construction as compared with bins on the ground.

Scratch litter, such as baled straw, shavings, and rice hulls, should not be stored in quantity in the same building with feed because of the fire hazard and also because of the difficulty of keeping stored litter free from rats and mice. A shed or barn somewhat isolated from the other buildings, in order to minimize the fire risk, is desirable for litter storage. If an open shed, it should face away from the prevailing direction of driving rainstorms. Baled straw, or sacks of rice hulls or other litter material in bales or sacks, should be piled on a slatted platform at least 1 foot above the floor. If possible, the piles should be narrow with aisles between. This reduces the protection afforded rats and gives dogs and cats a better chance to prey on them.

[5] Estimating 10 pounds of grain and 10 pounds of mash for each 100 fowls per day.

[6] Plan C-204. Feed Storage and Processing Building. Available from Calif. Agr. Ext. Service. Price 67c.

Fig. 63. A long laying house with concrete yards. Note the board-covered drainage pit next to the house which receives waste water from drinking vessels through a vertical 2-inch rain conductor pipe.

Problems Created by Smaller Yards

The relative merits of continuously confining laying and breeding hens to the laying houses as against allowing them out-of-doors represents a problem that has become of increasing economic interest in California. This is because of the expansion of the poultry industry from that of a side issue on the farm to a highly specialized type of farming of major importance, and to rapidly rising land values, particularly near the larger cities. Poultry products, like dairy products, are perishable and must be marketed frequently, expeditiously, and at low cost if the enterprise is to prove profitable. Those areas, therefore, most favorably situated with respect to good roads, transportation facilities, and proximity to good markets are most desirable.

High land values necessitate a large investment per acre on the part of those who embark in the poultry business. The high cost of land can be offset by the purchase of fewer acres. As the size of yards used for the fowls to run in will determine how many fowls can be kept on one acre, the use of no yards at all would permit keeping the maximum number on each acre, and so reduce the acreage required for the establishment of a poultry farm of any given number of birds.

This practice, however, is likely to increase the danger of overcrowding and may necessitate more careful management. Furthermore, it is especially important to provide all dietary essentials in the ration fed to confined birds. Under most conditions it is advisable to provide some outside yard space.

CHOICE OF MATERIALS

Dirt Yards. Dirt yards are satisfactory provided they are sufficiently large so that they can be cultivated with machinery, and kept sanitary. With dirt yards the rapidity with which the soil becomes contaminated with filth and disease germs increases as the yard space decreases.

Floored Yards. Paved yards (fig. 63) and wood or wire floors are being in-

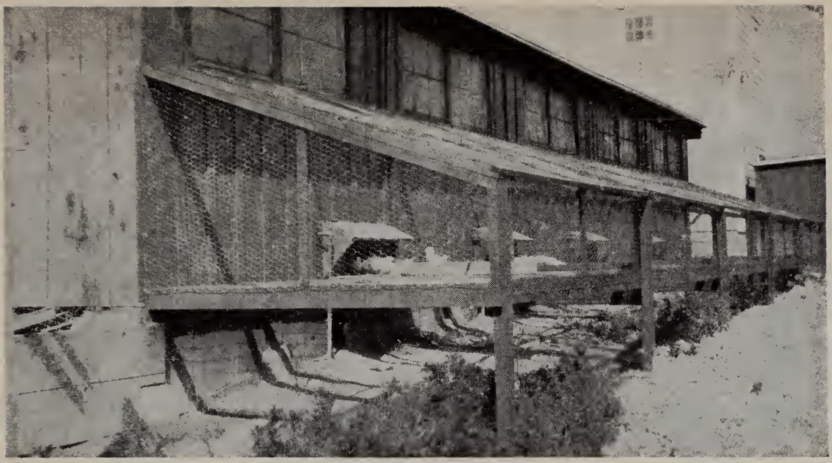


Fig. 64. Brooder yard with wire-mesh floor built on sloping ground. The enclosure is covered with wire panels which lift up. Slats may be used instead of wire.

stalled by poultry keepers who cannot give their stock free range but who wish to provide them with yards. Such yards are being advocated for both young and adult stock. They are usually made similar in size to the pen within the house, or even somewhat smaller. Paved yards are laid with a slope of not less than 1 inch in 10 feet to provide drainage, and are given a smooth surface which can be kept clean. Tight board-floor yards should be high enough from the ground to permit free circulation of air underneath and prevent rotting. Wire-mesh or slatted-floor yards prove most satisfactory when built narrow enough, and with the floor high enough above the ground, so that the droppings that fall through can be readily removed and the ground below kept free of rank green growth. Very sloping land is well suited to the use of wire-mesh or slatted-floor yards (fig. 64); level land is better adapted to the use of a paved yard unless the house is built high above the ground.

Wire Netting. For birds more than four weeks old, 1-inch-mesh hardware cloth or poultry netting is satisfactory. For older birds and for mature birds 1 × 2-inch-mesh wire netting is better. The ½-inch-mesh hardware cloth is required for younger chicks. Poultry netting galvanized after weaving will prove more resistant to the corroding action of the droppings than that which is galvanized before weaving.

Slats. Slatted floors are not so popular as wire-mesh floors for growing chicks. The slats catch and hold more of the fresh, moist droppings than does the wire and so provide more opportunity for the chicks to eat manure infested with organisms producing such diseases as coccidiosis and roundworms. Slatted floors, however, can be readily walked on and in this respect are more durable. This is important with yards for adult fowls, for such yards are larger in size and the need to walk on them is greater than with the narrow yards used for chicks. The slats may be 1 × 2 inches, placed on edge and spaced 1 inch apart. If the nail holes are drilled before laying, no trouble will be experienced from splitting, and heavier nails can be used to hold the slats from twisting.

Concrete. Concrete yards are constructed like the floor shown in figure 2 and as described on page 6.

Concrete yards can be used more in winter than dirt yards. The fowls can usually be allowed out in them right after a rain. In localities where the soil is heavy, birds using dirt yards might have to be confined and deprived of the full benefits of running out-of-doors during most of the winter and early spring. The soil would be too muddy between storms to let them run on it if the eggs were to be kept clean and the straw litter dry. In hot weather, a concrete yard can be covered with litter, and natural or artificial shade provided, in order to make it cooler for the birds.

GATES AND FENCES

As pointed out previously, an overhead litter carrier would be too small to use advantageously in removing dirty litter from the floor of a long laying house. This work can best be done with an auto truck or horse and wagon; and if the house is of the shed-roof type with reasonably large yards in front, means must be provided to get the conveyance from yard to yard so that it can be backed up to the doors in the front of the house and loaded. This is accomplished by means of removable 8-foot panels placed in each line fence. With these panels removed, a driveway is provided along the front of the house; and if the yards are wide enough, no difficulty will be experienced in backing the truck up to the front door of each pen. The construction of these panels is shown in figure 65.

Walk gates may be placed wherever most convenient. At the end of the yard, as shown in figure 66, will usually be found the most desirable location because it enables the poultryman to leave or enter any yard without passing through other yards. A horse and plow can be taken through the walk gate.

In the construction of fences, 4×4 inch rough lumber 9 feet long makes very sat-

Fig. 65. An 8-foot removable fence panel provides driveway in front of poultry house.

Fig. 66. Poultry yards with removable 8-foot panels in each line fence near the house. End and corner posts are 4×4 inches, line posts are 2×2 inches. Outside line posts require heavier bracing than do the inside posts to allow stretching of extra-heavy fencing around outside.

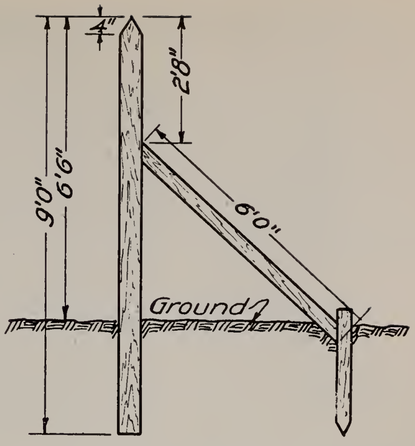


Fig. 67. Detail of brace for corner, end, and gate posts.

isfactory corner, end, and gate posts, and 2 × 2 inch rough lumber 8 feet long makes neat line posts. The posts are set so that they project 6 feet 6 inches aboveground for 6-foot fencing, and the tops are beveled. This places these posts sufficiently deep in the ground on heavy soil, but for sandy soil they may need to be longer and placed deeper. The braces used for corner and end posts can be made of 2 × 4 inch lumber and should be placed at an angle of 45° (fig. 67). If the distance over which the wire is stretched is longer than a 45° brace will take care of, however, the brace should be made longer. The steeper the brace and the narrower the upper surface, the more difficult it will be for chickens to walk up the brace and fly over the fence.

Durable steel fence posts of various types, from which one may realize some salvage value after having secured several years' use, are obtainable.

Construction Details for Litter Carrier

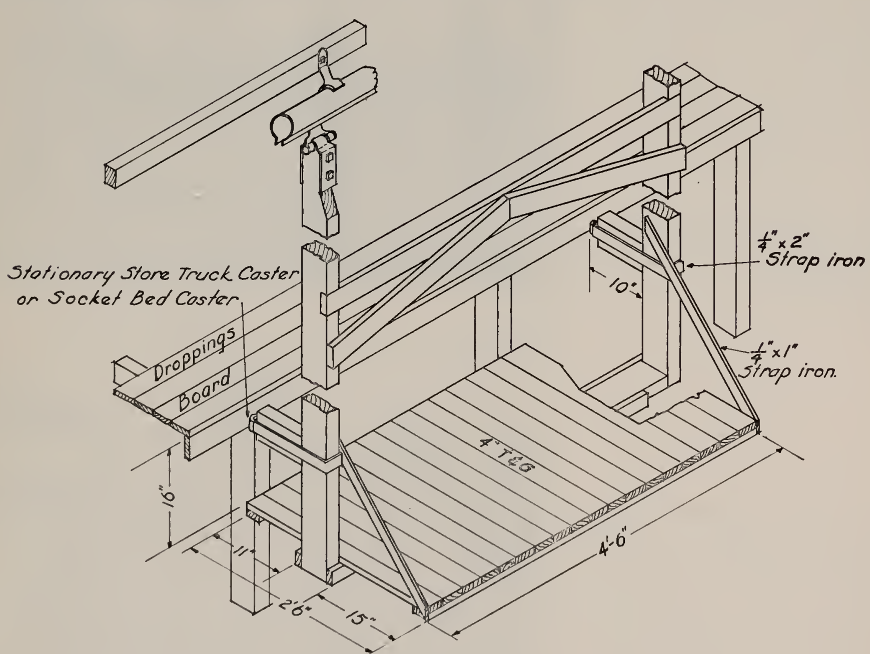


Fig. 68. Plan for construction of litter carrier pictured in figure 69.

Equipment THE POULTRYMAN CAN MAKE

The appliances shown in the following pages may all be constructed by the poultryman wishing to make his own equipment. All have given satisfactory results. Several types of similar appliances are manufactured commercially and are generally available through poultry feed and supply stores.

Locating the Equipment. The side and front walls of a poultry house are the most desirable locations for equipment. The side walls are recommended for nests; at least 10 inches of nesting width for each 6 hens should be provided, for trap nesting, one nest to each 3 or 4 hens. Green feed, grit and shell hoppers, and water may be located on the front wall.

For each 100 fowls, 4 linear feet of greens-hopper feeding space, 2 linear feet of grit and shell-hopper space and 3 linear feet of watering space should be provided.

Trough-type movable floor hoppers for mash (and grain if desired) are recommended. Two linear inches of feeding space per hen is sufficient.

All equipment should be so designed that it may be readily removed from the house to facilitate cleaning.

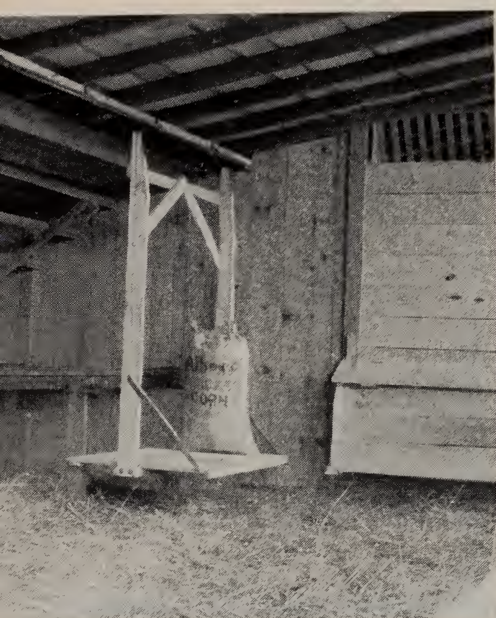


Fig. 69. A homemade litter carrier in use in a commercial laying house.

LITTER CARRIERS

The commercial laying house described previously has been designed for a litter carrier. In figures 68 and 69 is illustrated a homemade carrier of simple construction that anyone reasonably skilled in carpentry can build. It is suspended slightly off center so that the weight of the carrier holds the rollers on the ends of the projecting 10-inch arms against the droppings board. The flat platform is convenient for carrying sacks or cans of feed, or cases or buckets of eggs.

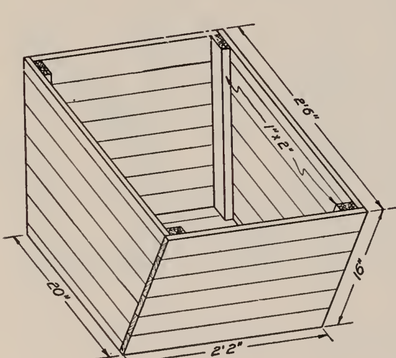


Fig. 70. Removable manure box for the litter carrier. Two boxes this size will fit on platform.

The two removable manure boxes (fig. 70) are light enough when filled with roost manure to be lifted off the carrier and dumped. They protect the carrier platform from becoming soiled with manure so that it is always in condition to carry feed and eggs.

Deep-Litter Nests

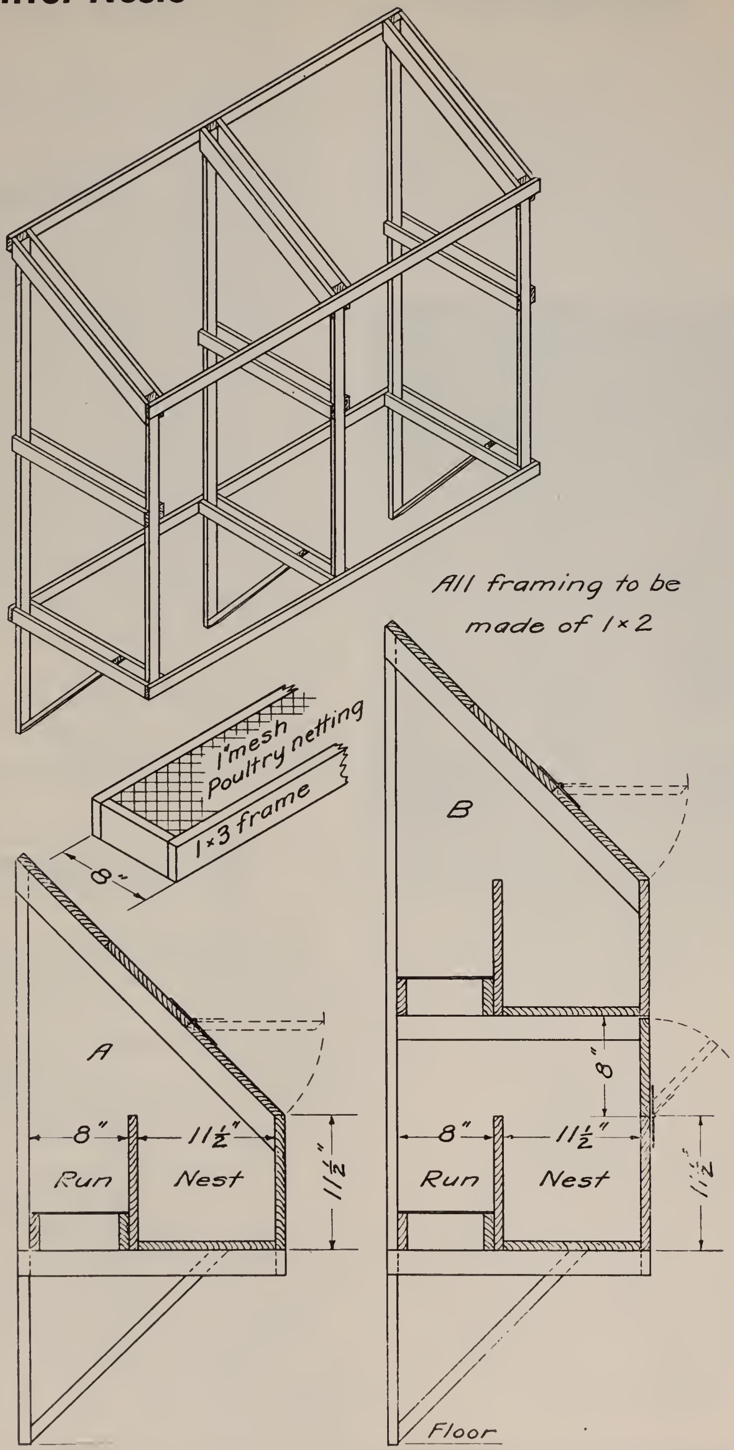


Fig. 71. Two types of nests are shown. A, a type that is installed as a single unit; B, a type that may be tiered three high. Unlike ordinary nests, the partitions in this drawerlike nesting trough are 2½ to 3 feet apart.

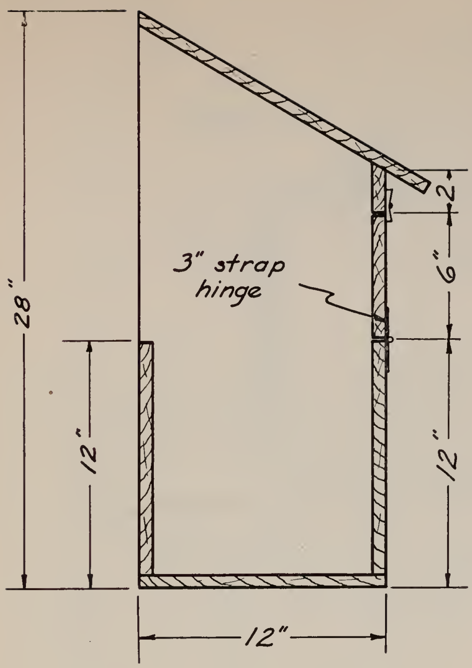


Fig. 72. Cross section of a deep-litter nest that may be serviced from the outside of the poultry house. It is suitable for the orchard type poultry house.

NESTS

Deep-Litter Nest. The deep-litter nest as shown in figure 71 is a recommendation from the Poultry Producers of Central California. Six to 10 inches of litter is recommended, preferably rice hulls. Other loose fluffy nesting material will do. The deep rice-hull litter keeps the eggs clean largely because the eggs are buried in the hulls by the movement of the hen. Other hens entering the nest are then not apt to break or dirty them.

Where it is desirable to gather eggs without entering the house, as in the case of the orchard poultry house, the nest shown in figure 72 may be used. This arrangement can be adapted for use in other poultry laying houses.

The framing for an open-front deep-litter nest is shown in figure 73. These are a little easier to construct than nests shown in figure 71. In both types of nests the deep litter helps to reduce breakage and soiling of eggs.

Framing for Deep-Litter Nest

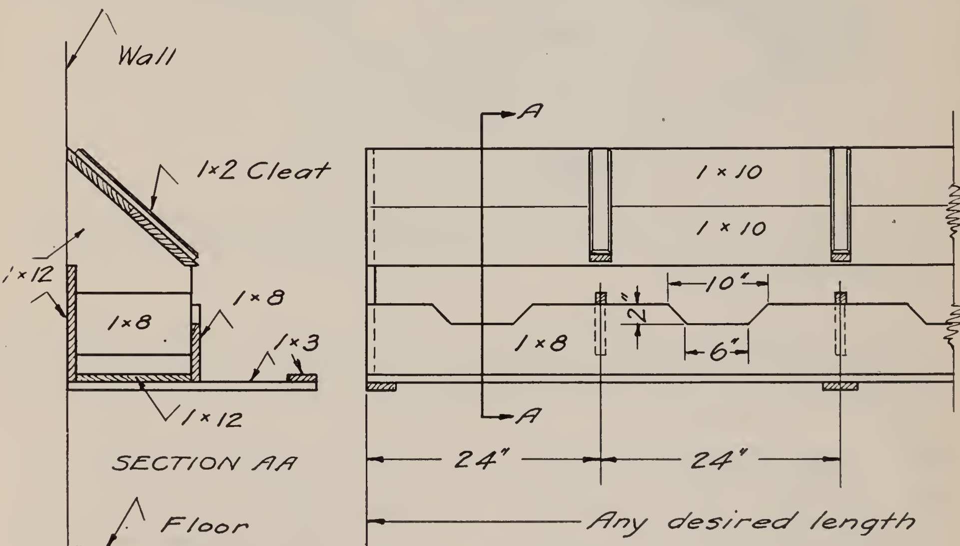
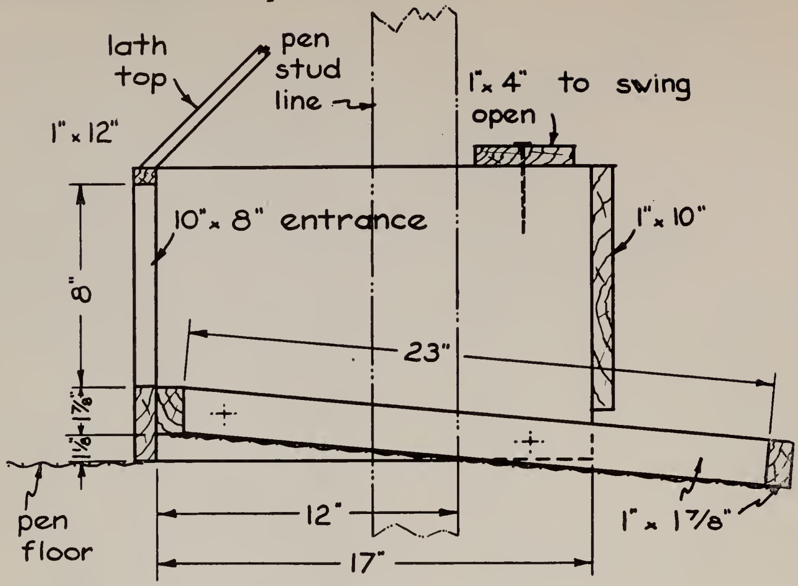


Fig. 73. Construction details of open-front deep-litter nest.

Details for Roll-Away Nest



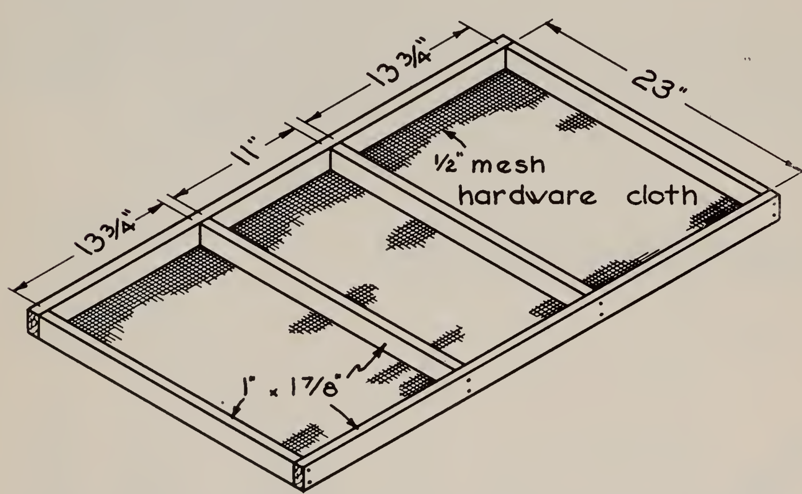


Fig. 74. The nest as shown extends into the center service alley. If differently located the nest box may need to be 16 inches high. The bottom should be fastened to the box with screws so that the slope may be readily adjusted.

Roll-Away Nest. The construction of a roll-away nest is shown in figure 74. This type of nest is commonly used in wire-floored structures because of the difficulty experienced with birds scratching out the litter. The one shown is set on the floor of an orchard house and juts into the alley. When the nests are placed in this way the feeders are put into the partitions and the pens made small enough so that there will be ample feeding space. If the space at floor level is wanted for feeders, the nests may be placed about 18 inches off the floor, but when this is done more eggs are laid on the floor outside the nests. Many of the eggs laid on these roll-away nests will be marked and must be cleaned.

Details for Trap Nest

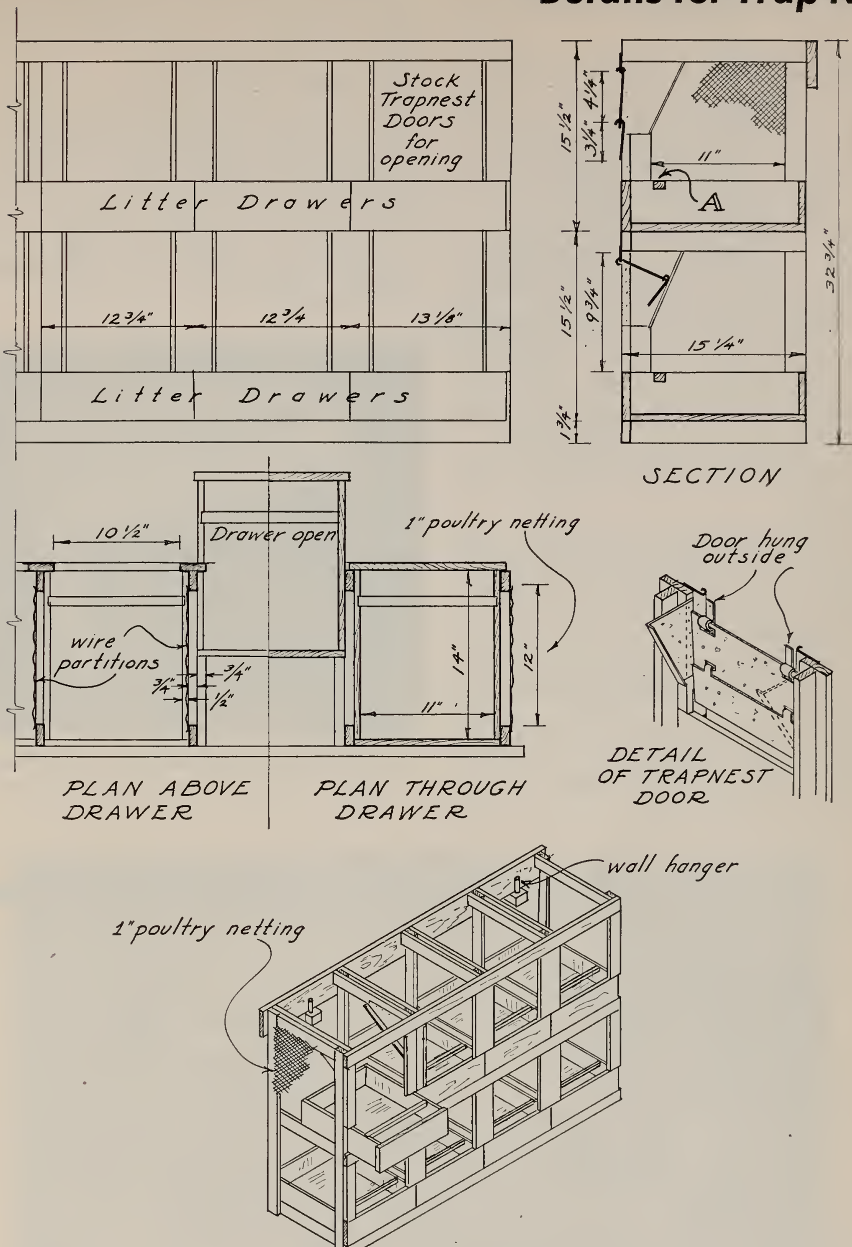


Fig. 75. In this deep-litter trap nest the strip A shown across the drawer at upper right is so placed to keep the hen up as she enters the nest so that trap front will be sure to trip. Most trapnests are now equipped with commercial wire fronts.

Trap Nest. A trap nest suitable for the hot interior valleys of California, because the sides are wire rather than of solid wood, is described in figure 75. The wood strips on the nest fronts may vary in width to accommodate any of the several types of commercial trap-nest fronts. A special feature is the drawer-type box for nesting material, which provides a deep-litter trap nest.

FEEDERS

Grain and Mash Feeders. Two linear inches of feeding space per hen is sufficient for dry mash or dry mash and grain. When moist mash is fed, enough feeders are needed to permit practically every bird to eat at the same time.

Feeders accessible from both sides provide twice as much feeding space for the same length of hopper as the wall hopper feeding only from one side, and should cost less to construct for the same bird capacity. Self-feeding hoppers are suited only to grain and dry-mash feeding. Trough feeders are used for both dry and moist mash.

Two type of feeders are shown in figures 76 to 79. Each type has a raised platform and trough in one simple unit that is light in weight. They do not require a grid to make them nonwasting and do not take up wall space. They will feed damp and dry mash equally well and may also be used for green feed. Figures 76 and 77 show the reel-type feeder, which is not so popular as the lath and tipping-board type (figs. 78 and 79) because small birds will crowd between the reel and trough side to nest in the hopper.

The reel feeder can be kept under the droppings board out of the way most of the year, if desired. Then, if artificial lighting is used in winter, it can be moved to the middle of the floor directly under the lights where it will receive a maximum of illumination.

Fig. 76. Open-trough feeder with reel that is light in weight and easily moved about.

Reel-Type Feeder

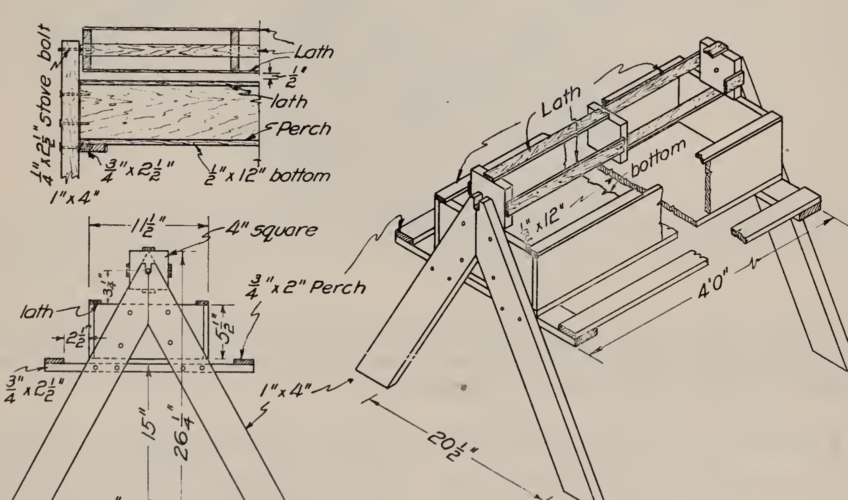


Fig. 77. Plan for construction of open-trough feeder pictured in figure 76.

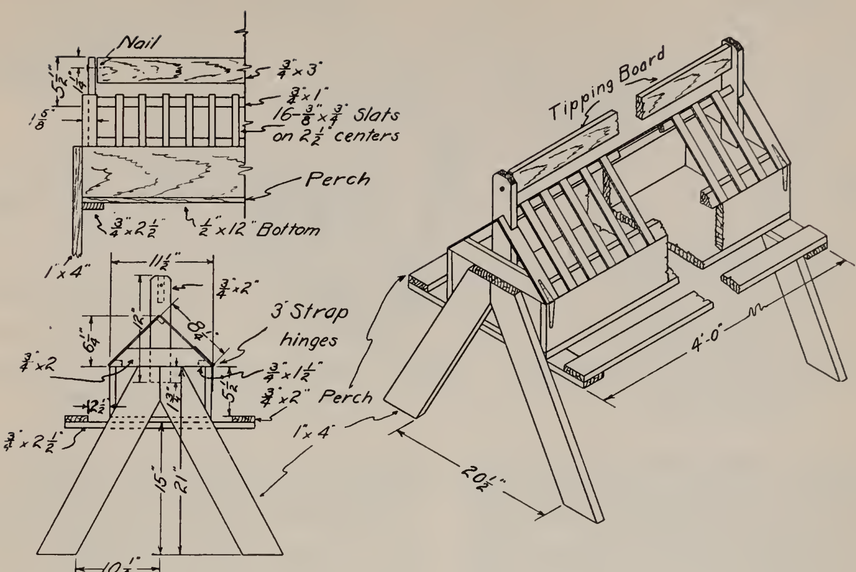


Fig. 78. Construction details for open-trough feeder pictured below,

Fig. 79. Open-trough feeder with slatted cover and tipping board instead of a reel.

Outside Feeders

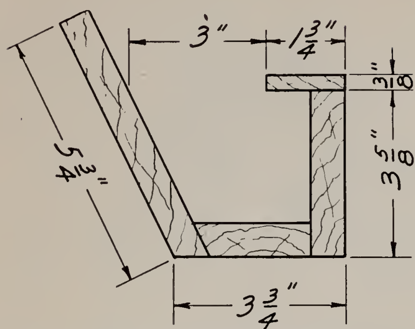


Fig. 80. Feeder suitable for use in orchard poultry house.

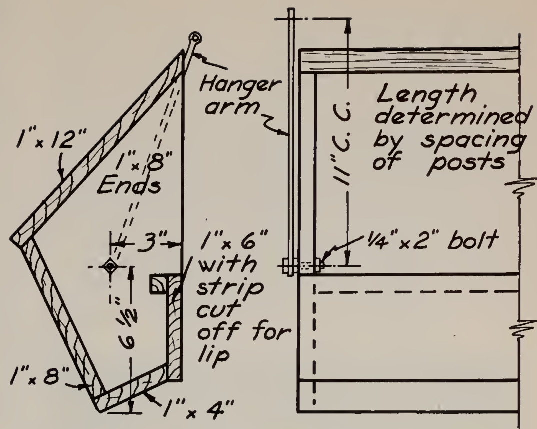


Fig. 81. Trough type feeder for use in unheated growing battery or on wire walls.

When it is desirable to place feeders on the outside of the pen, as in the orchard poultry house or the outdoor growing battery, the feeders shown in figures 80 and 81 may be used. The trough-type feeder does not provide protection against rain, hence can be used in the alleyway of an orchard poultry house or where otherwise protected. The feeder shown in figure 81 affords protection against rain and may therefore be used on the outdoor growing battery or where it may be exposed.

Green-Feed Racks. The most efficient way to feed finely cut green feed or chopped alfalfa hay is in a green-feed rack. The use of such a rack increases the consumption of greens and reduces waste. Fresh material remains in a clean, appetizing, succulent condition for a much longer time after being fed than it would

Green-Feed Rack

Fig. 82. Construction details for wall-type green-feed rack.

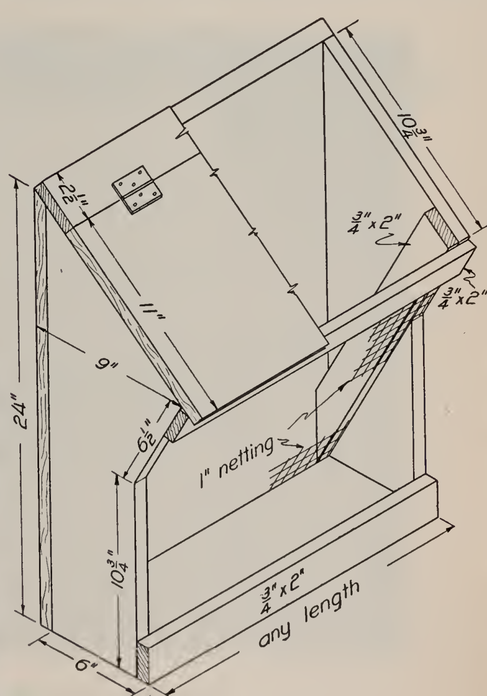


Fig. 83. A finished green-feed rack of the wall type.

Grit and Shell Feeder

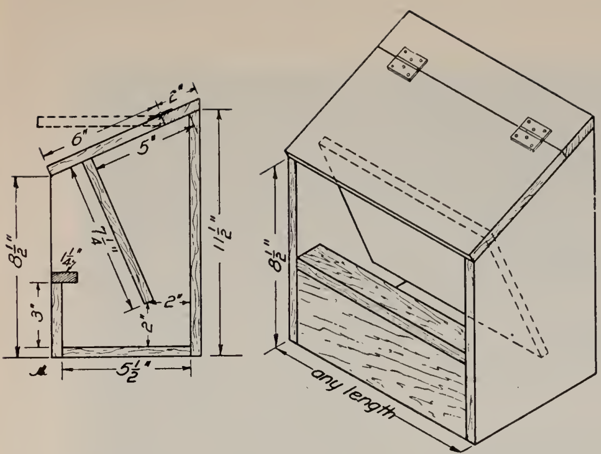


Fig. 84. This grit, shell, or whole-grain feeder may be built any length and divided into compartments.

if thrown on the ground to be scattered by the hens, and quickly dry out. One-half inch of feeding space per hen would seem to be sufficient in a green-feed rack to enable each hen to obtain enough fresh greens or chopped hay to meet her needs.

The rack illustrated in figures 82 and 83 is made to hang on the wall. Under the droppings board is a very convenient, out-of-the-way place for a green-feed hopper when it is desirable to save wall space for nests.

Grit and Shell Feeder. The feeder illustrated in figure 84 is very satisfactory for feeding shell and grit because these materials flow easily and do not clog in the throat of the hopper as do ground feeds. Two feet of feeding space for each hundred birds should be ample.

Chick Feeder. A chick feeder should be just shallow enough so that the chicks can readily feed from it; it should prevent waste; and it should be easy to clean. The hopper shown in figure 85 meets these requirements satisfactorily and is simple to construct. It consists merely of a shallow tray in which the grain or dry-mash mixture is placed. A grid made of ¾-inch-mesh hardware cloth cut ⅛ inch smaller all around than the inside dimensions of the hopper is laid on top of the feed to prevent the chicks from scratching it out on the floor. The grid is bound with a narrow edging of galvanized iron to stiffen it and cover the raw edges.

Only as much grain or dry mash should be put into the trays each day as will be consumed that day. The trays can then be scraped out clean every day after being used. A tray 4 feet long will provide enough feeding space for 100 chicks, to six weeks of age. After that time deeper

Chick Feeder

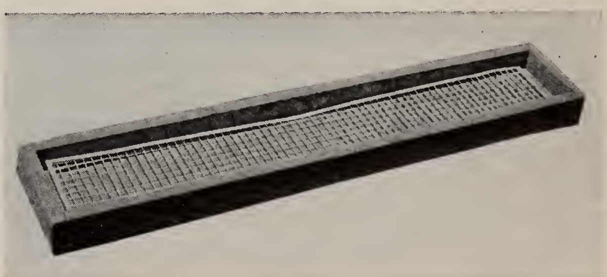


Fig. 85. Baby-chick mash feeder. A hopper 4 feet long, 5 inches wide, and 1½ inches deep, inside dimensions, is a convenient size.

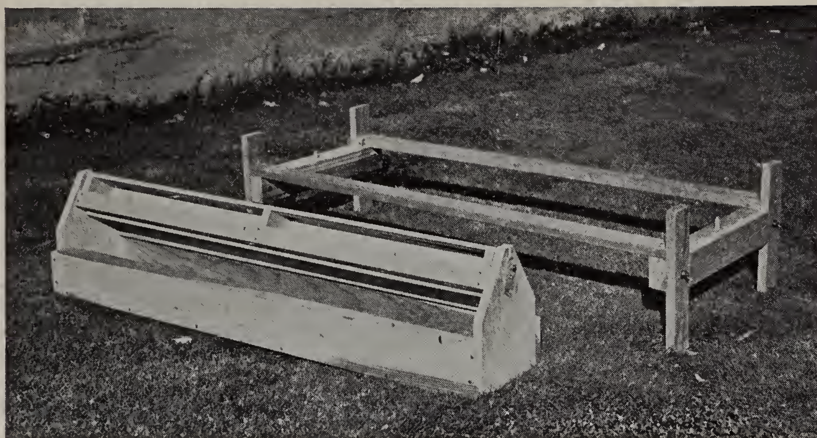


Fig. 86. Feeder for chicks 5 weeks to 6 months of age. This has an adjustable reel. The platform has adjustable legs, permitting feeder to be raised as chicks grow larger.

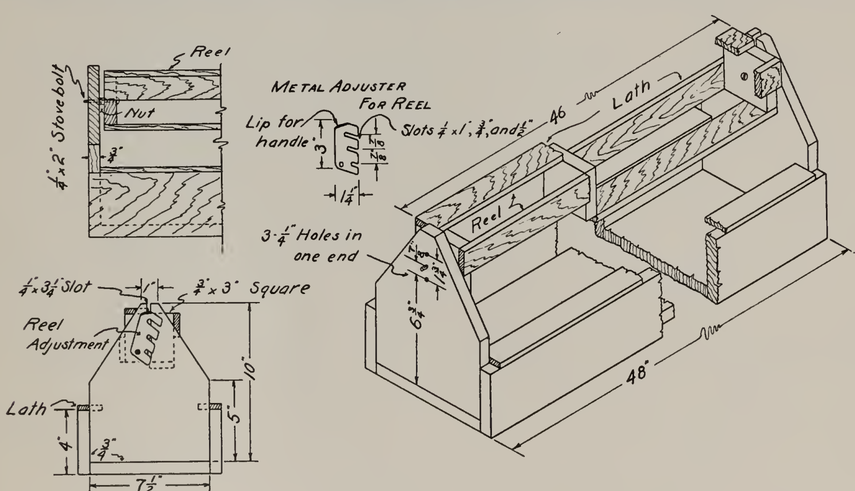


Fig. 87. Construction details for feeder pictured above.

trays and a few more of them will be needed. A wider and deeper tray for chicks over five weeks of age is shown in figures 86 and 87. It has a revolving reel to keep the chicks out of the hopper. If not filled over half full, a hardware cloth grid as recommended for the baby chick feeder is not needed to prevent waste. When over half full, however, the chicks will bill the feed out on the floor and waste it unless a grid is used. A 1-inch-mesh grid is better for the larger chicks than the ¾-inch mesh.

CATCHING DEVICES

A *catching hook* is shown in figure 88. The hook itself should not be so tightly closed as to pinch the fowl's shank, and care should be exercised not to jerk the fowl too hard in hooking it. When the hook is carelessly used, there is danger of bruising the fowl's shank or even breaking it. If used with care and judgment, however, a catching hook will be found convenient about the poultry yards. One

Catching Hook

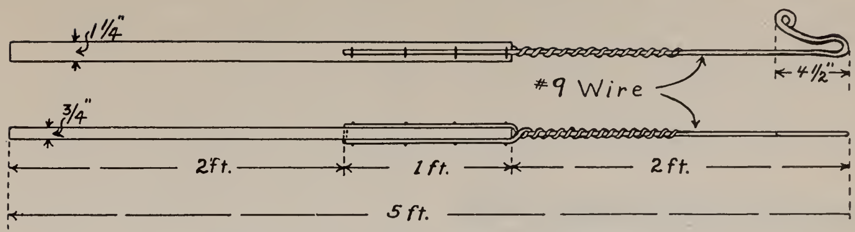


Fig. 88. Method of constructing a catching hook.

Catching Net

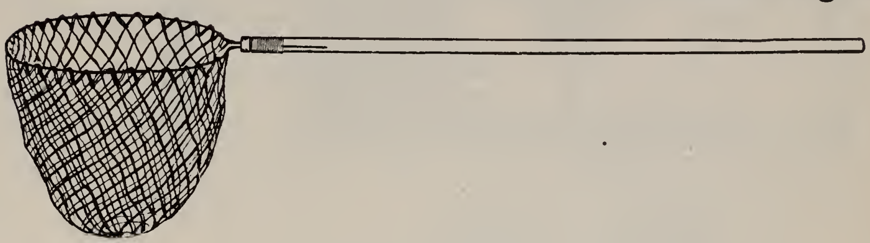


Fig. 89. A catching net is less likely to injure the fowl than is a catching hook.

could be kept on a nail in each pen, where it would be quickly available in catching sick fowls and culls as soon as discovered.

A *catching net* (fig. 89) serves the same purpose as a catching hook and most poultrymen find it more convenient to use than the hook. It is also less likely to injure the fowl. These nets can be purchased at poultry supply houses, or made at home with a handle such as a light hoe handle, some no. 6 spring steel wire and a cord net. The net part can be woven at home or obtained at a poultry or fishing supply house.

A *catching panel* (fig. 90) and a *catching crate* (figs. 91, 92) are indispensable labor-saving appliances when treating fowls for body lice, vaccinating for fowl pox, grading and culling, transferring from pen to pen, or whenever considerable numbers of chickens have to be handled or moved.

The catching panel shown in figure 90 is used by placing it in one corner of the pen or against one wall with one section held open. A group of birds is then driven into the enclosure formed by the panel with the walls of the pen, and the open section is swung to the wall to close the opening. A person can then enter this enclosure to drive the birds on into the catching crate or to catch them one at a time. Wire catching panels or fences can also be purchased.

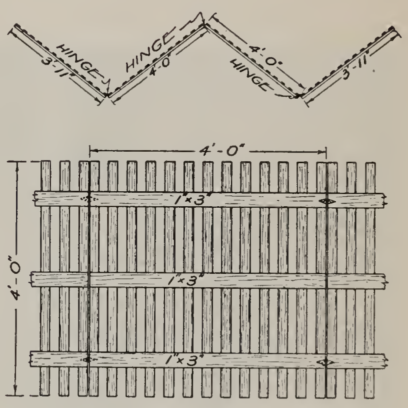


Fig. 90. Plan for construction of catching panel.

In using the crate, the end with the sliding gate is pushed tightly against the fowl exit, a coopful of birds is run in, and the sliding gate is closed. In removing the fowls individually, the poultryman sits on the crate and withdraws one bird at a time through one or the other of the doors in the top.

Details for Catching Crate

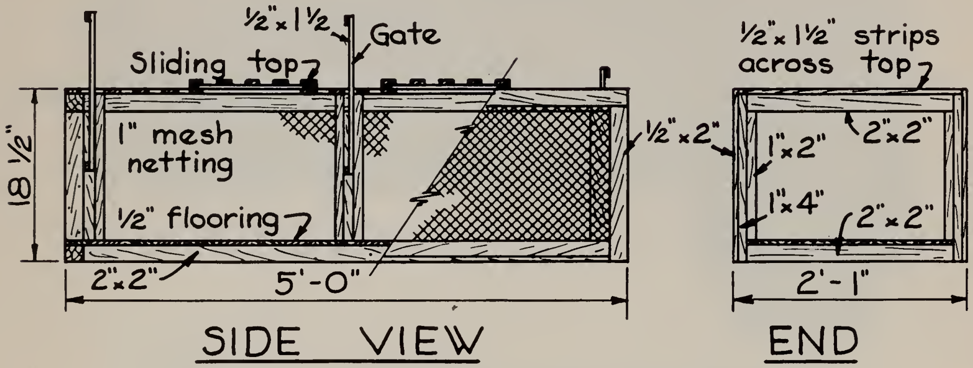


Fig. 91. Construction details for catching crate illustrated below.

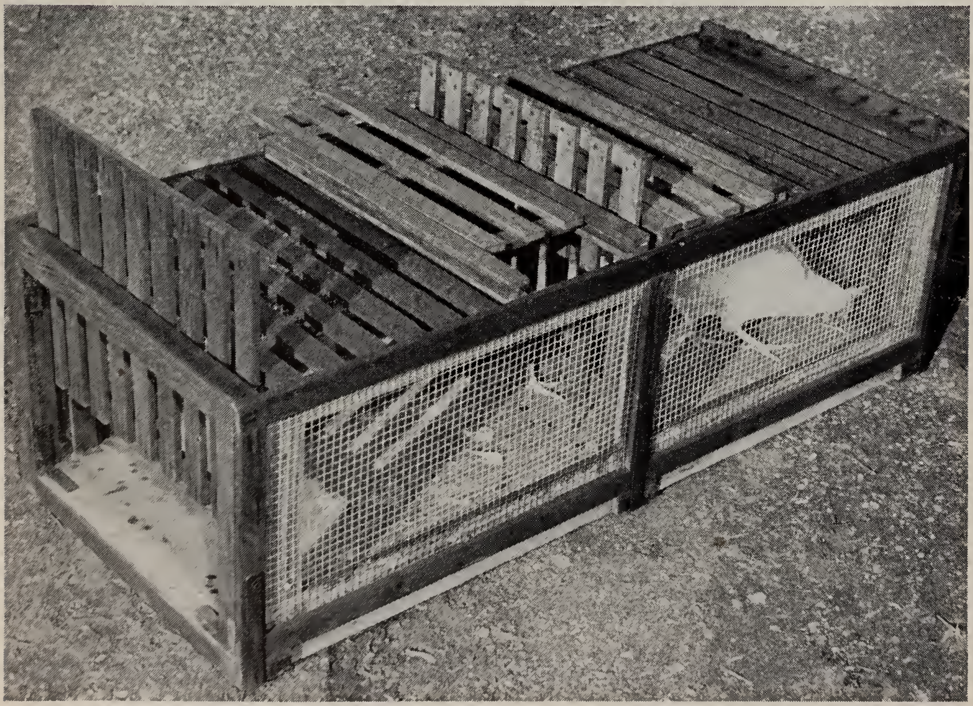


Fig. 92. Catching crate with two sliding end gates and sliding middle doors.

WATERING DEVICES

The California poultry keeper, with few exceptions, is fortunate in being able to pipe water to every poultry house without danger of the pipes freezing in winter. It is possible to provide automatically a continuous supply of fresh water every month in the year, and a great many ingenious watering devices are being used for this purpose.

Watering devices may be classified generally as non-automatic or automatic. The non-automatic are filled from pail, hose or pipe by the attendant. They include the open pails, pans, or troughs; and also the vacuum type fountains of earthenware or galvanized iron used mostly for young chicks.

The automatic waterers fall into two groups:

(1) *Continuous flow* or drip, for which a drain or runoff must be provided for surplus water. The flow is regulated to the maximum required by the birds. Examples of this type are the cup (fig. 93A), the trough, and the pan or pail (fig. 93B).

(2) *Controlled flow.* In these the flow past the valve is regulated by depth or amount of water in the drinking vessel. Examples of this type are the cup which may be filled either from above or below (fig. 93C); the trough (or pan or pail) filled from above, with a regulating valve operated by a float (fig. 93D) or by the weight of the water (fig. 93E); or the overhead individual drip valve, operated by a pin or brass ball (fig. 93F), and regulated by the bird picking at or touching the valve.

Any waterer should be capable of supplying enough water under all conditions. It should be sanitary: easily cleaned, not readily contaminated by feed, droppings or litter, and so constructed that there will be little or no spillage. Where water must be conserved one of the automatic controlled types would be preferred. The waterer used should be simply and sturdily built to give long and continuous service.

In cool weather, any of the waterers shown in figure 93 or their equivalent in other styles of waterer will take care of 150 hens in an 18 × 20 foot section of laying house; but in hot weather, additional drinking space is advisable. Cool water and ample space to drink are helpful in preventing losses from heat prostration. Fowls need more water on hot days than on cool days and there is, therefore, a greater demand made on the water trough. Poultry keepers may find it convenient to have auxiliary vessels for hot-weather use and thus eliminate the necessity of keeping surplus waterers clean and in repair when not needed. One-half inch of drinking space per hen should be sufficient to meet hot-weather requirements in most localities.

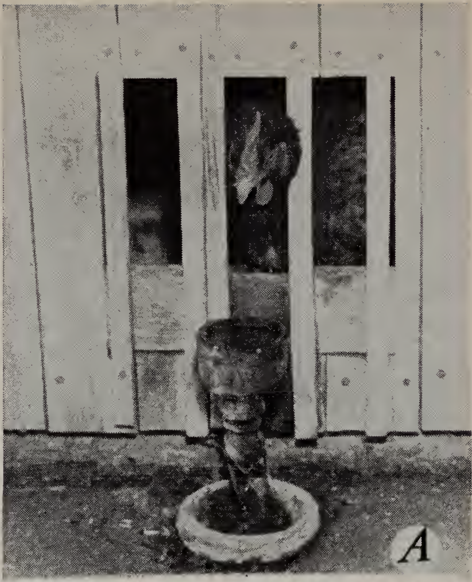
Excess Water. There is more or less spillage from most waterers, so it is important to provide for carrying off surplus water, or to keep the birds out of the wet litter. Note the methods employed in the illustrations of waterers (fig. 93). Wet areas in the litter provide a favorable environment for the eggs or cysts of intestinal parasites. It is important to keep birds out of wet areas which cannot in some way be eliminated.

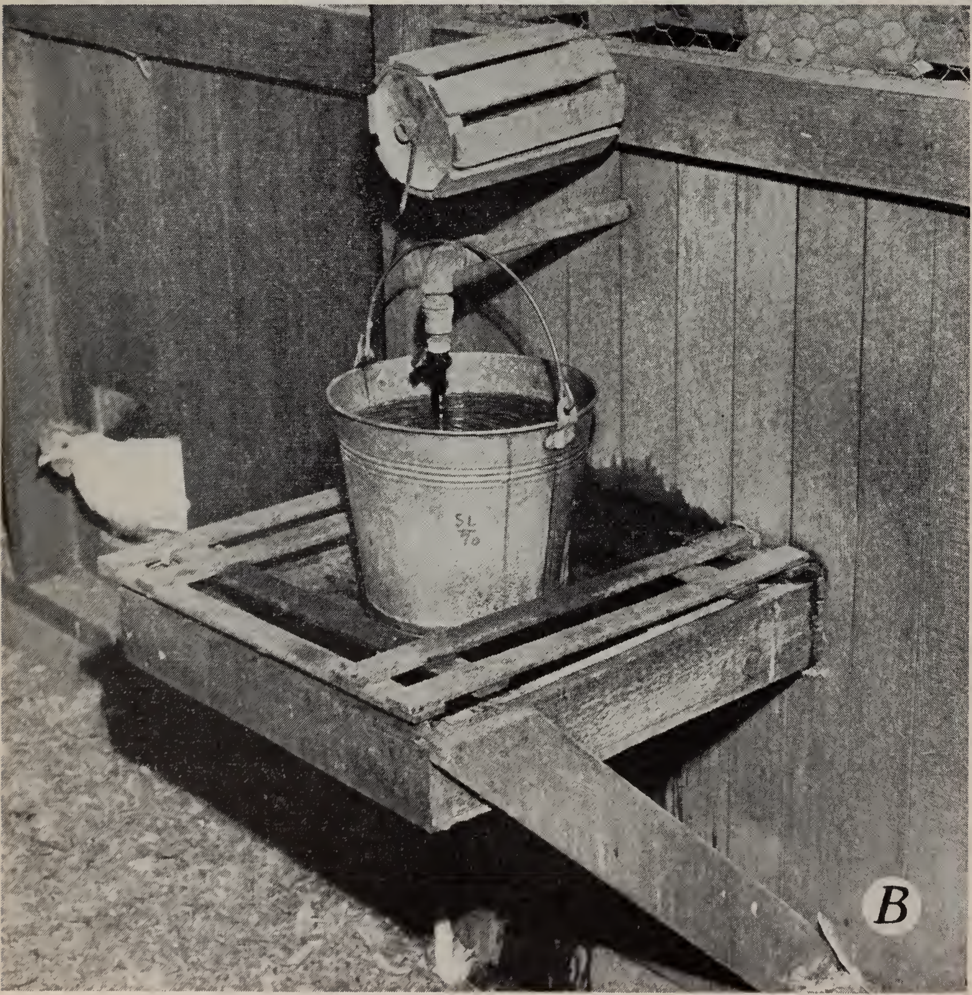
One method of eliminating excess water is shown in figure 93B, with construction details in figure 95. A galvanized iron pan or catch basin 18 inches square is supported in a wooden frame fastened to the front wall of the poultry house about 17 inches above the floor. A latticed lath cover rests on top of this pan and holds a pail or shallow water vessel. A gas cock, stop valve, float valve or automatic faucet is used to keep the drinking vessel full.

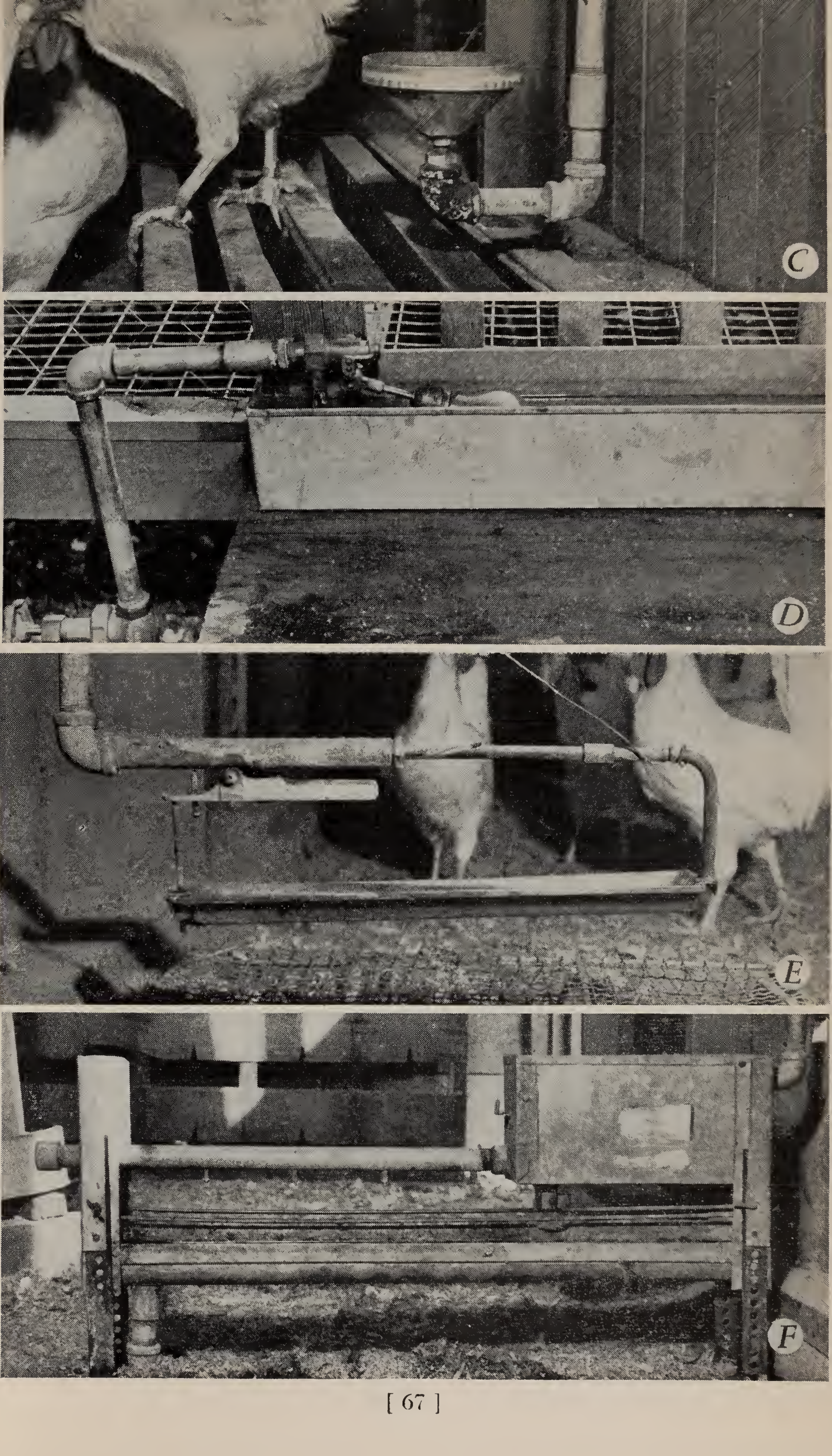
The water slopped out by the hens in drinking is caught in the large drain pan which conveys it out of the house and into a sump in the ground.

Types of Waterers

Fig. 93. A, continuous-flow cup waterer. B, continuous-flow pail waterer with catch basin and slatted cover to keep chickens out of overflow. C, controlled-flow cup waterer. D, trough with valve controlled by float. E, trough with supply controlled by weight of water. F, controlled drip valves with pressure-breaking tank required for correct water pressure.






C
D
E
F

Waterers for Chicks. Earthenware or other fountains are generally used for chicks during the first few days after they are hatched. Later, larger fountains that can be filled through the top are more commonly used. The automatic drip waterer (fig. 93F) and the pan waterer (fig. 94) can be adapted for use of chicks from day-old on. The pail waterer is suitable only for mature or nearly mature birds, since younger chicks may drown in it.

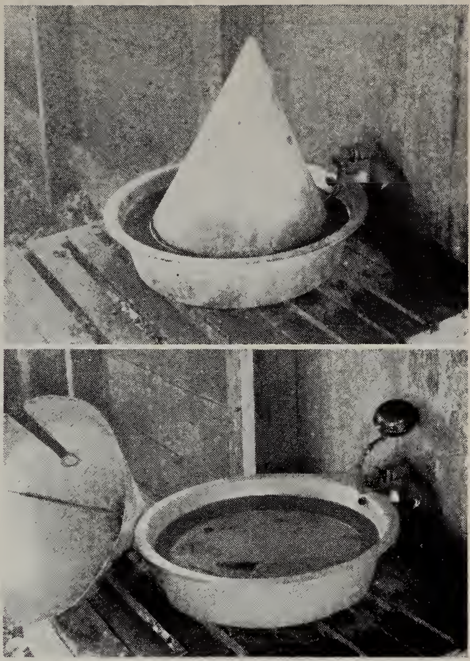


Fig. 94. A good chick waterer. An overflow pipe is soldered into the side of the pan and extends through wall to outside of house. Conical top fits over arm of float valve. A wire guard can be used instead of cone.

Details for Catch Basin

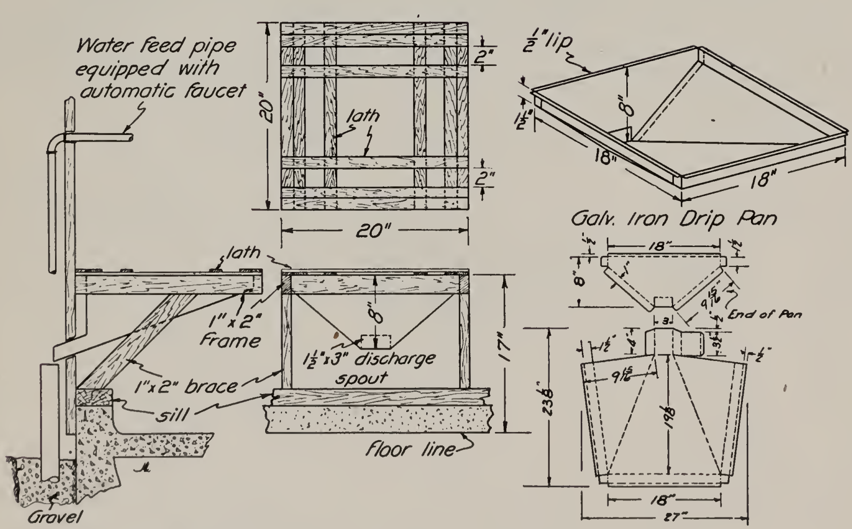


Fig. 95. Construction details for metal catch basin and platform shown in figure 93B. Such a device is necessary for keeping birds out of wet litter often surrounding drinking devices.

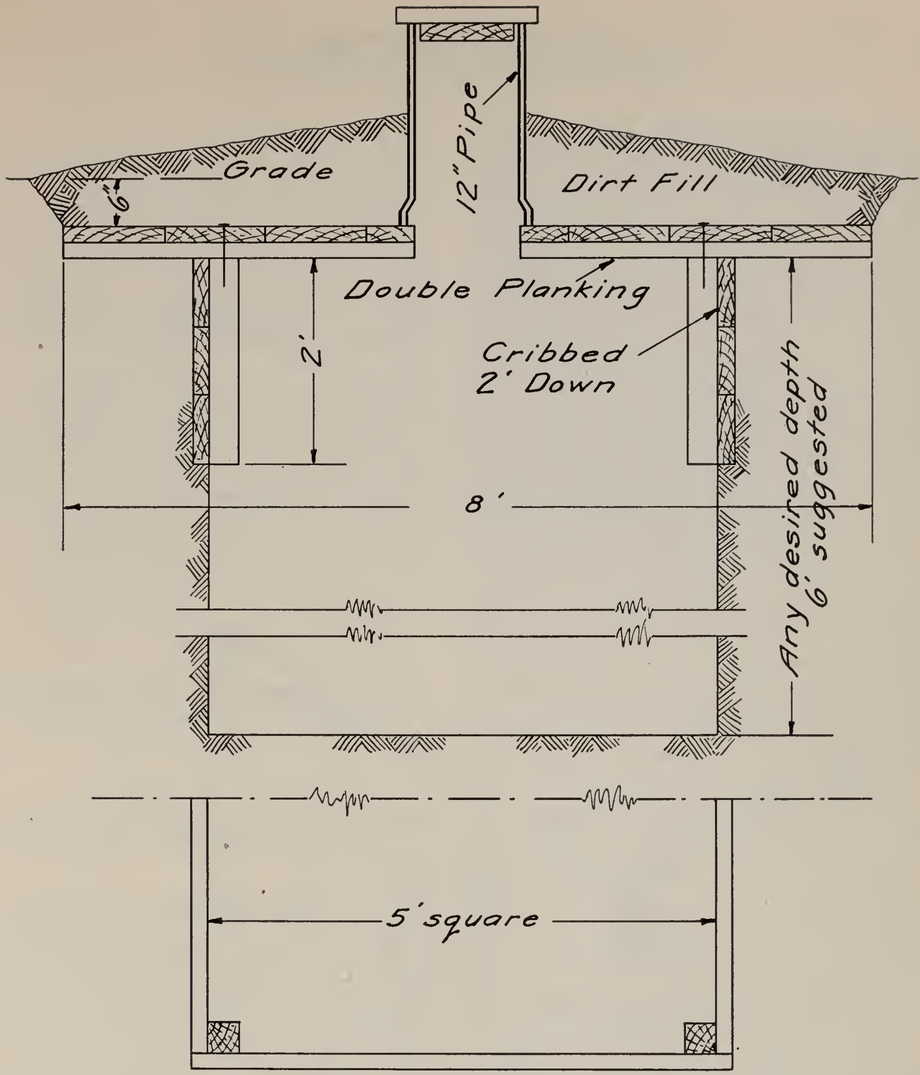


Fig. 96. Framing of disposal pit. Dead birds can be dropped into the pit promptly, thus reducing disease hazard. When the pit becomes full, the cribbed portion of the walls and the top may be removed and placed over a new excavation.

DISPOSAL PIT

The disposal of birds that die or must be killed because they are unfit to market constitutes a serious problem on many poultry farms. These birds are usually a definite disease hazard to the rest of the flock. Cremating such birds has not proved satisfactory in many cases because pressure of other work prevents prompt disposal. A disposal pit has the merit that dead birds can be dropped into the pit, thus requiring a minimum of time for this job. Framing details for such a pit are shown in figure 96. It will serve the needs of most farms for a long time.

Because of the danger of soil contamination, the pit should never be placed on sloping ground above a well or poultry yards. On level ground it should be at such a distance and in a location where seepage from it is not likely to contaminate a well.

About 13 hours of natural and/or artificial light, having a minimum intensity of one foot candle where it strikes the birds, will bring mature pullets into egg production and enable them to continue to lay. Many pullets and hens will lay despite shorter hours and less light intensity, but others will stop laying during the winter months when the days are short. During long periods of rain or fog the light in the poultry house during the day may be so dim that the use of artificial light throughout the day may be needed to help maintain egg production. Either morning light or a combination of morning and evening light may be used to provide a 13-hour day. Dim all-night lights, or one to two hours of bright light in the evening, have also been used, but on most farms no advantage over the continuous 13-hour day is gained by their use.

A 100-watt lamp at a height of 7 to 8 feet from the floor, with or without a reflector, will provide adequate light for a unit 20 × 20 feet. A correspondingly larger lamp will be required in wider houses. In long houses of ordinary width without partitions, the 100-watt lamps may be spaced about 20 feet apart. An ordinary light bulb or fluorescent lamp should be used. In houses with dropping boards the lamp should be about half way between the front wall and the front of the dropping boards. In houses without dropping boards the lamp should be about half way between the front and rear walls.

A correctly designed reflector will add to the effectiveness of the illumination obtained from an electric lamp. The reflector may be a galvanized iron homemade one 16 inches in diameter and 4 inches deep as shown in the construction diagram (fig. 97), or a commercial type such as the No. 75, 12-inch R. L. M. dome reflector.

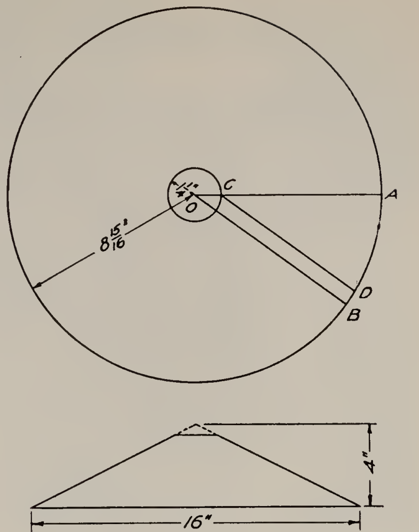


Fig. 97. A homemade reflector which can be built from instructions given below.

How to Make Reflector. Set a pair of dividers to $8^{15}/_{16}$ inches, and with this as a radius scribe a large circle. With the same center, *O*, scribe a small circle with a radius of $1\frac{1}{4}$ inches. Draw the line *OA*. Set the dividers to $5\frac{1}{2}$ inches and lay off *AB*, and then connect *O* and *B*. To allow for the lap in putting the edges together draw the line *CD* $\frac{3}{8}$ inch from, and parallel to, *OB*. With tin snips, cut out the large circle, cut along lines *AO* and *DC*, and cut out the small circle. In putting the reflector together, the edge *CA* should lie along the line *OB*. Rivet and solder the reflector together and apply two coats of aluminum paint inside. Then attach the reflector to a lamp socket by means of a suitable shade holder.

ALARM CLOCK TIME SWITCH

Many different methods have been devised for setting up an alarm clock to throw the electric-light switch in the early morning hours. There are several commercial time switches on the market. Figure 98 shows a simple arrangement that works effectively and is easily constructed.

How the Time Switch Works. A, ordinary alarm clock is fastened securely to shelf. *B,* alarm key turns counterclockwise when alarm goes off. *C,* piece of heavy galvanized metal holds weight *D.* When alarm goes off, tip of plate *C* slips from the key, allowing weight *D* to drop clear, and pulling cord *F.* Pulleys *EE* are placed to line up cord *F* so that it may pull properly on the lever of switch box *G.* Weight *D* may be a section of cast-iron window weight.

Care must be taken to see that the clock is firmly held in position on the shelf, that the weight *D* may drop with free clearance, and that the cord and pulleys are in proper alignment to throw the lever on the enclosed knife-switch box.

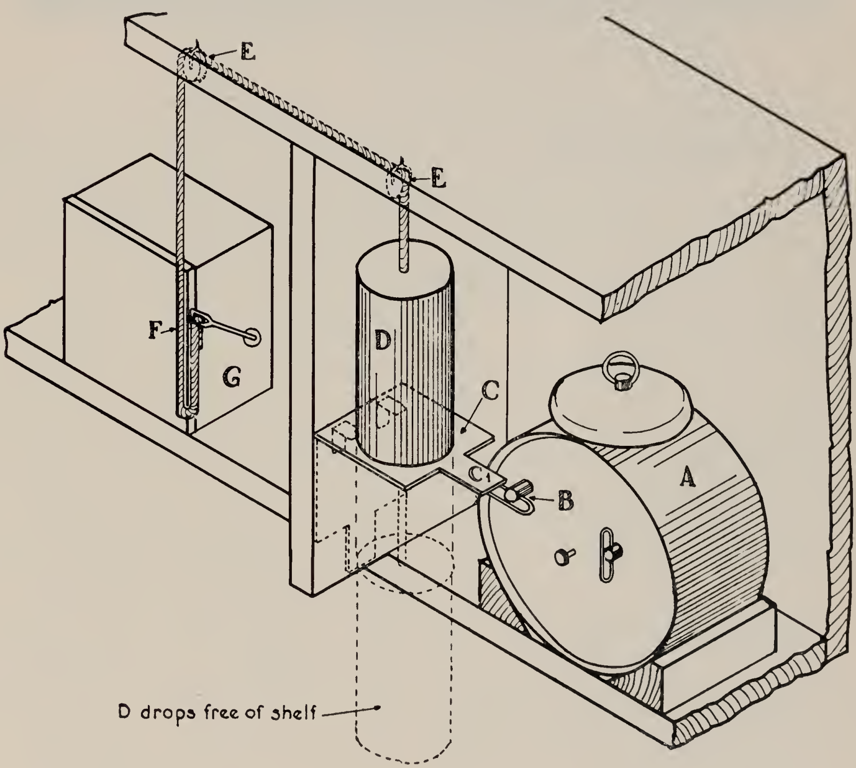


Fig. 98. Time switch for turning on electric lights in poultry house.

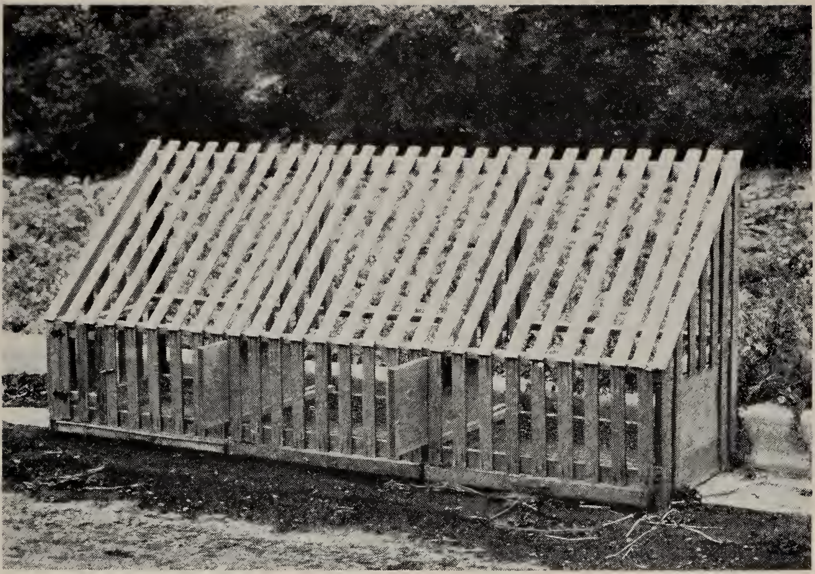


Fig. 99. A broody coop like this is easy to make.

BROODY COOPS

Most poultrymen prefer a small broody coop in each section of the laying house. Small units of individual hen batteries may be used. A homemade broody coop is illustrated in figure 99.

Broody hens are put from nests into the section of coop at left. The second day they are driven into the center section; the third day into section at the right. The fourth day they are released. A sliding board forms a partial partition between each two sections.

EGG COOLERS

Eggs deteriorate rapidly if they are kept in a warm dry place, particularly during the first 24 hours after they are laid. Therefore it is desirable to gather eggs frequently and to cool them promptly. The egg cooler illustrated in figures 100 and 101 is not expensive to construct. It has been found to aid materially in conserving the quality of eggs during warm weather.

This type of cooler uses the principle of evaporation of water to lower the temperature. It should be shaded from direct sunlight and is most efficient when air is permitted to circulate about it freely. A cooler placed in a closed shed or room will not give satisfactory results.

Before the burlap is applied to the frame it may be rinsed in a solution of 1 pound of copper sulfate to 5 gallons of water. This will help prevent mildewing of the burlap and prolong its usefulness.

Most moderate to large poultry farms now have an egg room. An egg room should preferably be insulated although it can be similar in construction to the feed room. It should have a minimum of about 25 square feet of floor space for each 1000 laying hens. An evaporative cooler fan (fig. 102), or other suitable cooling unit should be used. Such rooms have given excellent results and the costs of construction, maintenance and operation are not excessive.

A mechanically refrigerated egg cooler,[7] built in a suitable egg room equipped with

[7] Plan C-544. A mechanically refrigerated egg cooler. Available from the Calif. Agr. Extension Service. 41 cents.

Details for Egg Cooler

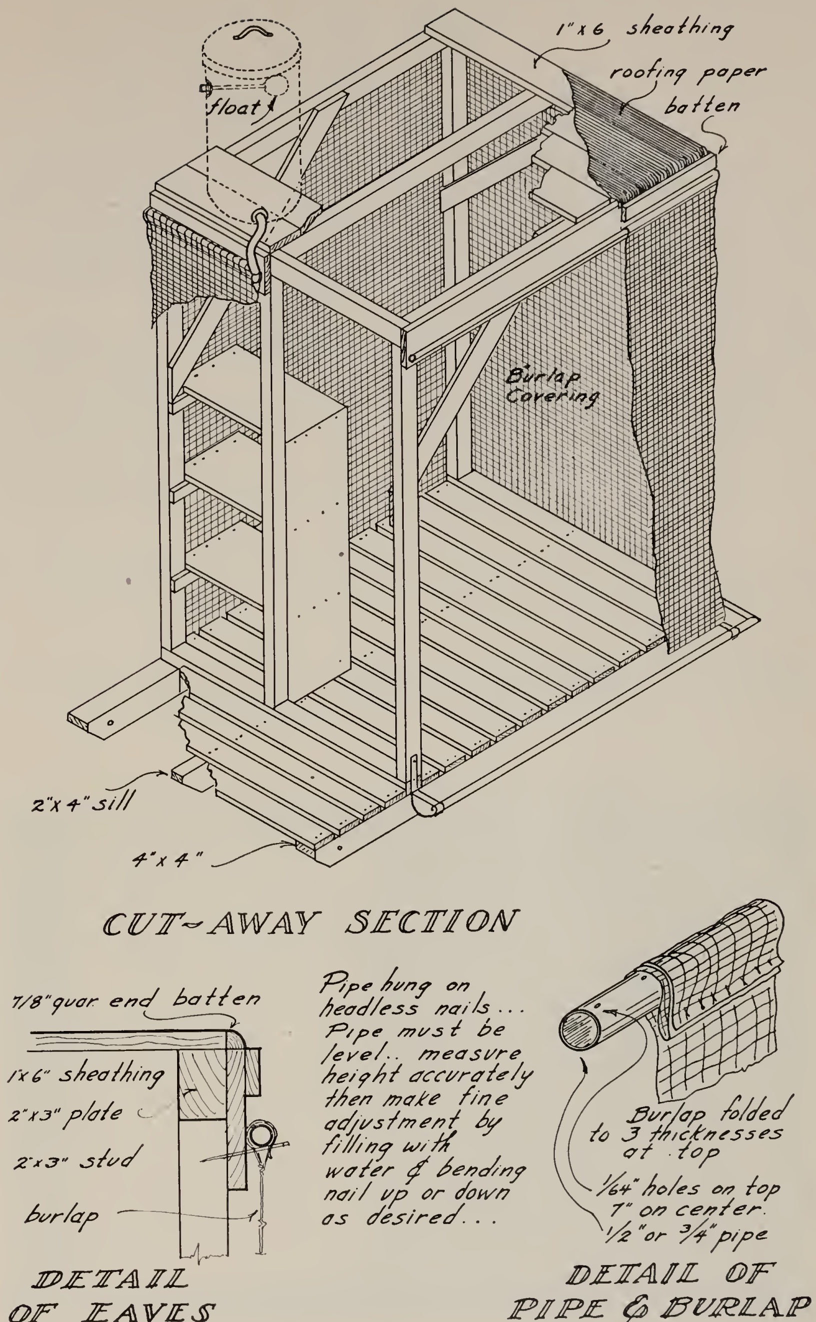


Fig. 100. This egg cooler gets its water supply from a small-sized garbage can, shown in cut-away section. A float and valve is installed near the top to regulate constant water supply. The special details showing adjustment of pipe and burlap wrapping are important and should be followed closely.

an evaporative cooler, has been shown to result in improved quality of eggs delivered to market, as compared with the quality of eggs kept in a room with an evaporative cooler fan.

There has been a corresponding increase in returns for the eggs. Such a mechanically refrigerated cooler will maintain a temperature of 55° to 60° F regardless of outside humidity, hence—unless the cost is excessive—it represents a worth-while investment.

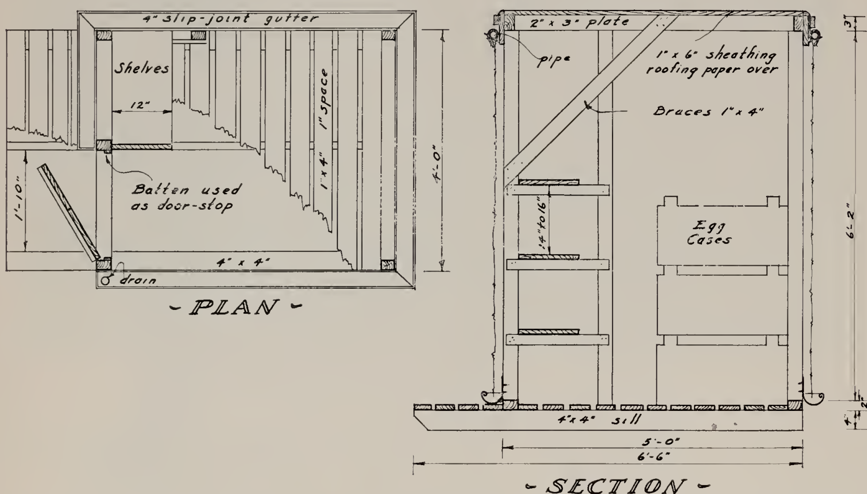


Fig. 101. Plan and section drawings of egg cooler. A watertight top is not necessary when the cooler is located under a stormproof roof.

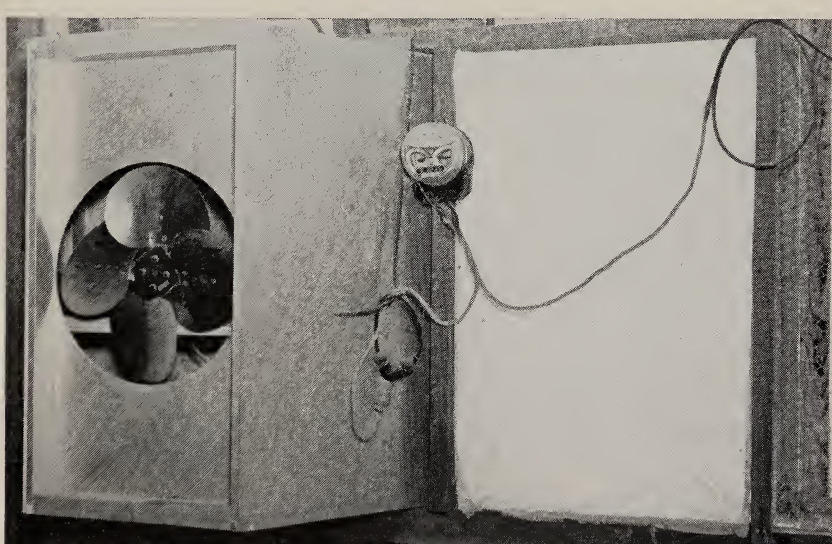


Fig. 102. Evaporative cooler consists of an electric fan and an excelsior pad through which water is slowly percolated. The fan draws air in through the moist excelsior pad.

Contents

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ORCHARDS

TRUCK CROPS

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